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Recent Guayule Developments

Chemical, Cultural and Mechanical Improvements

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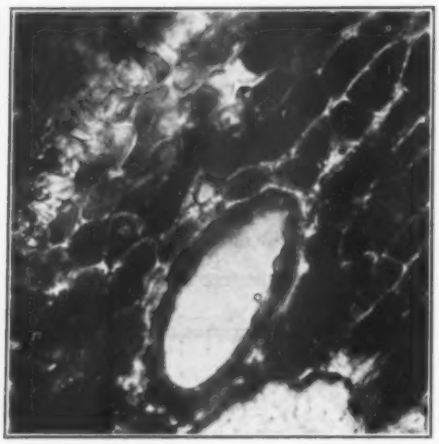
DURING the two years that have elapsed since certain papers were read at the Philadelphia meeting of the American Chemical Society on the chemistry, botany and production of rubber from guayule shrub, there have been further discoveries and developments of some importance on which it seems opportune to report, not only to the technician but also to the trade in general.

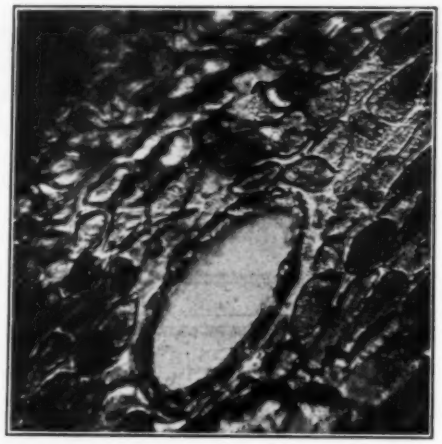
The long accepted and time honored belief that the caoutchouc of guayule occurred in the living plant in a massed and fully formed condition similar to its state in the plants at the time of extraction has been replaced by definite proof that in the living and active cells the rubber is in a very complete state of dispersion, probably in less concentration than in hevea latex, especially in young plants and in plants abundantly supplied with water, but surpassing it as the agglomeration and/or coagulation stage is reached through the desiccation which, in the arid climate of Central Mexico, promptly follows removal from the ground. However, coagulation may be effected at any desired stage by heat or chemical coagulants. We have not yet shown that the same result is brought about by the simpler acid ferments. In fact, we have shown that the chopped plants can be stored under silo conditions for many months with all rubber globules remaining in violent Brownian movement despite the acetic acid simultaneously developed, and also without the deleterious effect of acetic acid admixture on its vulcanizing properties.

Section of guayule plant stem several years old showing distribution of tissues containing rubber. These have a general grey appearance and constitute both the middle pith and the bark or cortex on the outside together with strips of tissue (medullary rays) extending between them[1].

The so-called "resin" that has always been associated with commercial guayule rubber has no place in the rubber cells of the plant but is largely confined to the canals clearly shown in Dr. Lloyd's photomicrographs shown herewith. Hence the union of the two is a purely mechanical process taking place during the fine grinding which is a necessary step in present methods of rubber extraction. However, Dr. D. Spence has developed a method of treating macerated shrub before final grinding which profoundly affects the condition of the acetone soluble constituents and in large measure prevents their incorporation with the product. In want of a better word we have called this "retting" but it goes much beyond the usually accepted meaning of this term and by decomposition of certain of the plant's proteins brings a marked improvement in the vulcanizing qualities of the product, this quite apart from merely lessen-

[1] These photomicrographs of guayule grown near Salinas, Calif., were taken by Francis E. Lloyd, Macdonald Professor of Botany, McGill University, Montreal, Can., author of "Guayule: A rubber plant of the Chibuahuan Desert."

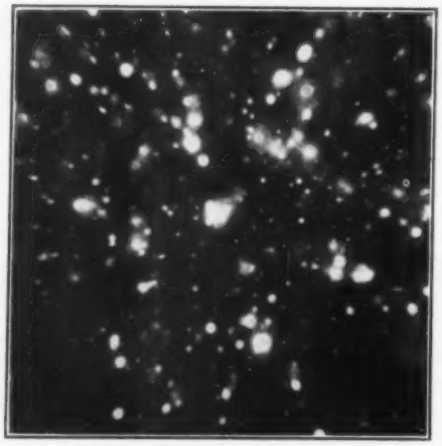




Left—Portion of living cortex. Cells appear more or less uniformly dark, due to fact that rubber occurs in great numbers of minute particles and in active Brownian movement, consequently their images become totally blurred in photograph unless taken instantaneously. Right—Same piece of cortex after treatment to coagulate rubber which now forms fairly solid vitreous looking masses in cells. Note oval resin canal separated from rubber bearing cells.

ing the non-rubber content.

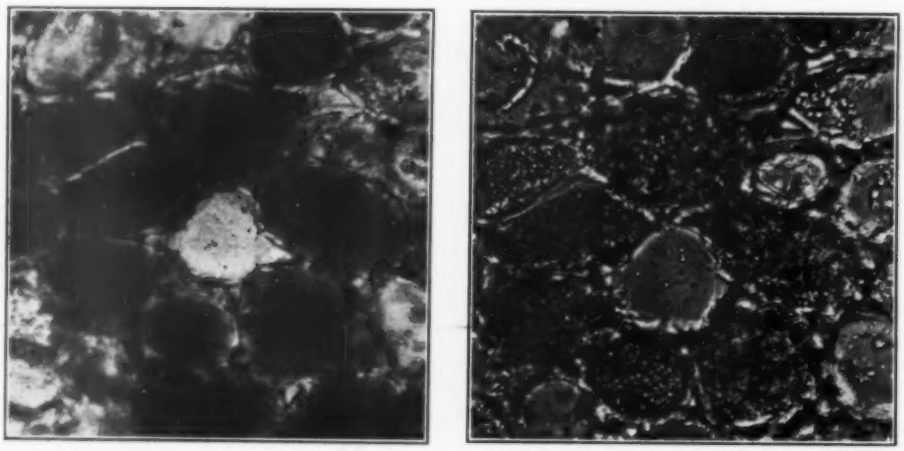
The beneficial effect of these protein decomposition products on vulcanized rubber is now generally recognized. It is also a fact of considerable importance that the special varieties of cultivated plants grown in California give a better response to retting than the wild mixed varieties, and the small pilot extraction plant in operation in California for the past six months has turned out dry rubber without the use of solvents containing as low as 7 per cent acetone soluble material with tensile-elongation properties quite similar to smoked sheets. However, the natural product from cultivated varieties that have not been retted is always under 20 per cent in acetone soluble material with tensiles on a gum formula well over 2,500 pounds, and it is therefore doubtful whether there will be any commercial incentive to shrink the weight of the product until the present large demand for Ampar guayule is saturated. Ability to do so during an emergency will always be a factor of importance.



Photograph at high magnification of rubber suspensoids of guayule after having been released from cells.

The mechanical process of extracting clean rubber from cultivated shrub is vastly easier than with mixed wild shrub. This is not only due to a generally higher caoutchouc content and easily maintained uniformity of shrub condition but to the fact that when harvested the tissues are much younger, have never been subjected to the same degree of excessive desiccation, are less closely knit and are softer in structure. The outer covering is more in the nature of a skin than a bark, and the living rubber bearing cells of the cortex are frequently covered by a pliable epidermis only 1/64 of an inch in thickness. The absence of the thick covering of dead, corky bark which characterizes wild plants makes for a quicker and cleaner agglomeration of the coagulated but still minute cell sponges into particles of recoverable size. Rupturing the cell is still a necessary but greatly facilitated preliminary. The cellulose refuse is ground much finer and, we confidently believe, will be usefully and profitably employed for insulation and otherwise.

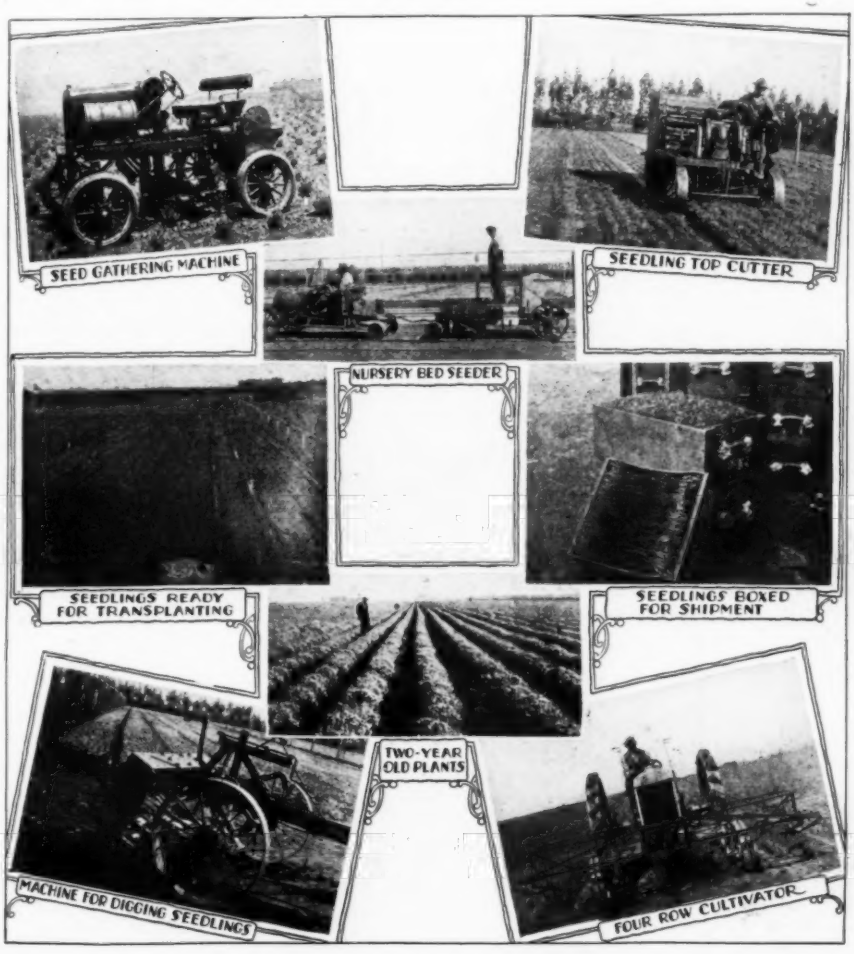
The fascinating biochemical study of the metabolism of rubber in the guayule plant is only fairly started but from now on the work will be intensified under Dr. Spence and Dr. McCallum in California. It would not only be revolutionary but premature to seriously state that the function of rubber in guayule was that of a reserve food supply, but such a conclusion is rather strongly indicated and no other theory fits the known facts, one of which is a falling off of as much as 40 per cent in the determinable caoutchouc content within a few weeks after vigorous spring growth sets in following winter dormancy. Can the rubber hydrocarbon retrace its steps to a water soluble and hence an available condition when hunger calls? The plant does not lay by



Portion of pith in living condition. Blurred solid appearance of cells containing rubber indicates active movement of rubber particles which upon coagulation can be photographed showing minute granulations as seen in illustration on the right.

reserve food in the form of starch, but the same general treatment that stimulates starch accumulation in other plants will build up rubber in guayule to as much as 20 per cent of its dry weight. In the past our ignorance could be easily covered by saying that Nature probably put the rubber in the cortex to diminish evaporation during periods of extreme drought. The fact that in living plants the rubber is only found in complete suspension in cell sap necessitates another explanation.

Guayule appears to be a prodigal spender of its income and reserve and will not prepare for the future as long as there is an abundance of available moisture to permit self aggrandizement and indulgence of its strong reproductive instinct, flowering and seeding right up to the first frosts when plentifully and continuously supplied with rain or irrigation water. This is probably a part of its desert heritage when dependence on drought to follow stingy summer rains was only too well founded. We believe we have learned how to give free rein to rapid spring growth and then to stimulate the provident trait without employing measures that are sufficiently drastic to throw the plant into premature dormancy, thus giving it a chance to build up its depleted reserve. Be it noted that these measures are effective regardless of the acceptability of the rubber food theory herein advanced.



Dr. McCallum also learned that the formation of actual rubber in guayule does not cease when the plant is pulled from the ground and stored under the right conditions. In fact, there is some reason to believe that rapid synthesis is stimulated by the shock, always provided the plant at the time of pulling is healthily filled with the simpler components that eventuate in rubber. We have innumerable instances or commercially cultivated plants where a freshly pulled specimen would yield by analysis around 12 per cent rubber on a dry basis and after being "cured" for a month under readily applicable conditions it would show 16 per cent. Also, the process can be considerably accelerated if and when there is occasion.

The mechanical job of improving guayule milling practice has been fascinating and the necessary adaptations to fit California conditions are in the competent hands of William H. Yeandle, vice president in charge of Mexican operations.

Of greater immediate importance has been the mechanical work of J. M. Williams, manager of cultural operations in the United States for twelve years. After having developed a practical machine or device to do away with every item of hand labor from seed picking to plant harvest except the very important and bothersome item of hand cutting weeds between the younger plants in the rows, where they were not evenly spaced, he has at last overcome this by a new planting machine that still sets out four rows at a time but spaced at precise intervals with regard to latitude as well as longitude, thus permitting cross cultivation with the same four row cultivators. The practical importance of this will be appreciated when it is understood that hand hoeing weeds represented approximately 35 per cent of the total labor cost of growing guayule shrub in California and accounted for 40 per cent of the man-days.

During several months of the past year the entire executive and technical staff in Mexico and California received the benefit of direct contact with Prof. Francis E. Lloyd, who returned to a study of our problems after a lapse of twenty years. There was no phase of our work to which he did not contribute something of real value but particularly where his wizardry with a microscope came into play.

The story of this little plant's reluctant domestication is fragmentary and will not be even approximately complete for many years. Two hundred acres were set out in the fields in February, 1926, 600 in 1927, 1,800 in February of this year and the Salinas nursery now has plants for approximately 2,800 acres which will be set out next February. A policy of conservative expansion has been adopted and will be adhered to regardlesss of either the ups or the downs of the crude rubber market.

British Favoring Pneumatics

Pneumatic tire makers in England are much encouraged with an order of the Ministry of Transport allowing, after October 1, heavy motor vehicles, if fitted with pneumatic tires, to travel 20 miles an hour instead of 12 as heretofore.

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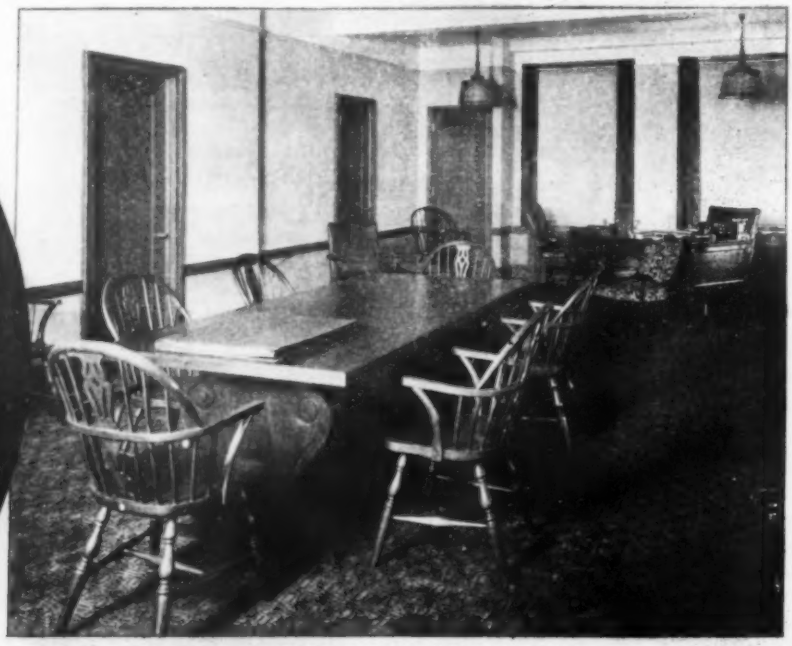

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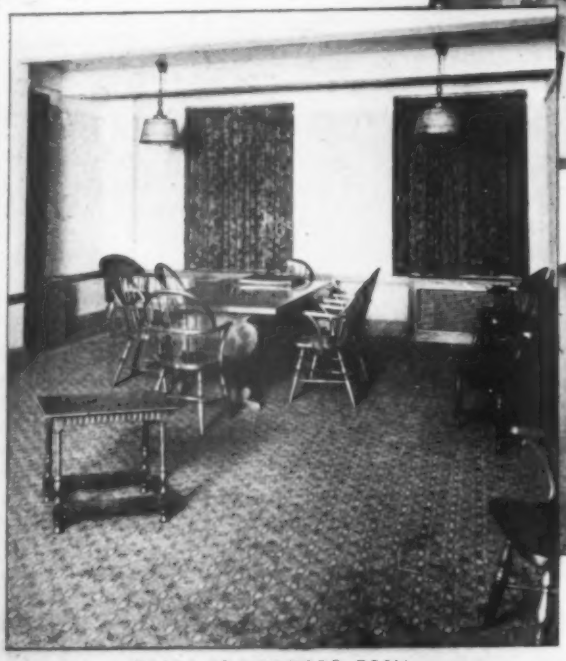


BOARD OF DIRECTORS ROOM

RUBBER INSTITUTE OFFICES

Standard Interpretation
of the
Manufacturers' Standard Warranty

Prepared by

Service Managers Committee Tire Manufacturers Division
The Rubber Association of America, Inc.

For

The Rubber Association of America, Inc.

and

The Rubber Institute, Inc.

EFFECTIVE August 16, 1928, all members of the Rubber Institute, Inc., and The Rubber Association of America, Inc., adopted a new standard warranty.

In order that all members who have adopted this warranty may apply it in a uniform, effective and equitable manner, this standard interpretation has been prepared.

First of all the new warranty is *sound* because it is based upon the principle that the manufacturer is thoroughly responsible for the quality of his product. The consumer is protected against loss of service through conditions which the manufacturer can control and the responsibility for proper tire usage and ultimate results from an operating standpoint is entirely in the hands of the user.

Then it is *fair*, because it treats all customers on the same equal basis. It does not discriminate in favor of the customer who uses his tires severely. The tire is either defective or it is not defective. If defective, it is the responsibility of the manufacturer and if not defective, it is the responsibility of the operator. Thus the manufacturer pays for his mistakes and the customers for theirs and there is no unwarranted expense to be added to the price of the tire which would cause all buyers to pay for the abuses of a few.

And this new warranty is *economical*, because, it eliminates waste resulting from replacements on non-defective articles, and therefore helps to keep the price of tires at a low level. It also encourages the user to take proper care of his tires since no provision is made for replacements on tires failing from abuse.

Application

In the application of this new warranty, it is of course necessary that the service men for member companies be thoroughly trained on the difference between defective and non-defective tires so that each customer receives the proper decision in accordance with the merits of his claim.

Claims on Defective Products

When a tire is defective and has failed to give proper service, the manufacturer should be willing to assume his full obligation as outlined in the warranty. The service man should determine the amount of service still remaining in the tire or the normal expectancy of that tire, which means the amount of service it would have given if it had not proved defective, and then figure the allowance on a new tire accordingly.

For example. When a defective tire shows by its general condition that it has given about one-half the service it would have given had it not proved defective, the customer would be entitled to a new tire of the same size and type at one-half price.

The question naturally arises then as to how to arrive at the exact proportion of total service that a tire has given at the time of failure.

This must be determined by taking into consideration *all* factors, such as condition of beads, carcass sidewalls and tread of tire, also time used, mileage, load carried and nature of operating conditions, and then figuring out what proportion of normal average service the tire in question has given.

The first thing to determine is "how much service on the average has the customer a right to expect from tires on the wheel from which the tire in question was removed?"

The adjuster should find out as definitely as possible how much service the old tire has given. Then he should determine how much service tires could reasonably be expected to give, on the average, on this particular wheel. The customer should then be charged an amount to cover the fraction of the total expected service which he actually received.

No *single* factor can logically be used as a basis for adjustment. Take for instance mileage. The distance that a tire *has traveled* is no true gage of what mileage it would have given had it not been defective.

The same is true of *tread thickness*. In certain types of service the carcass of a tire will wear out long before the tread. In such cases an adjustment based on tread thickness would be out of order because it would not reflect the exact percentage of the total potential service that has been consumed.

In using tread thickness as an *aid* in determining the proportion of service consumed it must be remembered that in normal service tires generally fail because of other conditions before all of the tread rubber has been worn away. Therefore, if a tread was ½-inch thick originally and ¼-inch has been worn off, that does not mean that the tire is half worn out—but more nearly two-thirds or three-quarters worn out. When any part of a tire gives away after it has given reasonable service, without regard to the condition of the

Standard Warranty

"EVERY pneumatic tire of our manufacture bearing our name and serial number is warranted against defects in material and workmanship during the life of the tire to the extent that if any tire fails because of such defect, we will either repair the tire or make reasonable allowance on the purchase of a new tire."

other parts, that tire may be properly considered worn out.

In some cases claims may be presented on tires that have given what might be considered normal expectancy for the service in which they were used. Even though tires covered by such claims are defective, they are not subject to replacement. In fact, if a replacement were figured on such a tire, the replacement price would be as much as the regular selling price of the tire because the old one had delivered full service or in some cases more than normal expectancy under the conditions under which it was run.

Then there will be some tires, even though defective, that can be repaired. Where a minor defect is of no general consequence so far as the balance of the tire is concerned, and it can be satisfactorily corrected by repair, such repair should be made charging the customer according to the service received. In some cases such repair might be free of charge, but in other cases, because of the service the tire has delivered, it would be only equitable to charge the customer a proportionate amount of the regular repair price.

Claims on Non-Defective Products

All claims on non-defective tires should be diplomatically refused as the warranty makes no provision for replacements on tires of this description. It would not be fair to those customers who take care of their tires to adjust tires that fail through accidents or operating conditions, for by this means the expense of the unwarranted replacements would be added to the cost of the tire, and those customers who did not make unwarranted claims would be paying for the losses on those claims which were unwarranted. Now that tires are warranted for life the customer is treated with utmost fairness in cases of claims on defective tires and this justifies the rejection of all claims on non-defective tires.

In many instances tires injured through operating conditions can be repaired. These repairs should be charged at regular price for there is no allowance due. The practice of making concessions on repairs when the tire has failed on account of operating conditions leaves in the customer's mind a feeling that he had something coming, but the company was unwilling to give it to him. This can be avoided if he is thoroughly sold on the idea that his tire is not subject to claim and that the repair is simply a means for him to buy back the service that still remains in his tire. There should be no free repairs on non-defective tires.

Routine of Handling Claims

The routine of handling claims is just the same as it has been in the past. It is necessary to obtain a Claim Form on every casing or tube submitted for inspection. This form should be personally filled in and signed by the owner of the article. Complete information is required by the service man in analyzing the claim so as to establish service conditions and arrive at the proper basis for determining the normal expectancy of the article involved, as the length of time in service and the conditions under which the article has been used has some influence on what the customer should normally expect from his tire equipment.

The Report on Claim should be used whether the claim is on a defective product or non-defective The idea back of the report on claim is to give the consumer the decision that the manufacturer has made and help the dealer in settling the case promptly. By this means the dealer may be able to continue selling the customer who may not be so well pleased with the decision handed down by the manufacturer. He does not, in other words, blame the dealer for the proposition submitted, and the dealer has a better opportunity of selling him by stepping in as a middle party.

In many cases to prevent padding of replacement prices where the report on claims cannot be used, as in the case of distributers, the confirmation of replacement form will still be used. This is mailed out by the branch or home office direct to the owner who signed the claim form and simply confirm the proposition that was made through the distributer, warehouse or dealer. Thus the practice of increasing replacement prices for unwarranted profit is discouraged.

Transportation charges on tires returned and new tires shipped out on claims will be borne by the customer. Likewise, service charges for mounting and dismounting the old tire should be paid by the owner. The dealer can handle this very nicely by simply invoicing the customer for the new tire at the replacement price and then adding the service charges indicating just what they are on the invoice. By this means the dealer need not be put to any unnecessary expense in handling replacements and at the same time he can keep his customers satisfied with the proposition which the company has made without alteration.

Conclusion

The basic principle of this new warranty is to treat everyone on the same fair and equal basis and to give the tire users who buy standard makes of tires covered by this warranty every bit of protection that they are honestly entitled to. It is the fairest warranty that has ever been placed on pneumatic automobile tires and once it is explained to the user in the proper manner he is sure to appreciate it, for even though his claim may be rejected, he realizes that no one would get an allowance under the same conditions and he is being treated no differently than any other tire user. Likewise the user is encouraged to take good care of his tire equipment so as to establish the highest possible basis of normal expectancy and get more from his money than he would get under any other kind of a guarantee.

Chemists to Curb Illness Loss

WHILE it is not easy to estimate the proportion of loss sustained by the billion-dollar rubber industry through employe illness, it may be fairly assumed to be a large part of the annual total of 2,250 millions determined by an expert for the National Conference Board, Inc. Hence rubber makers are interested in any plan promising substantial improvement in this direction. Like many other great industries, it has been doing much to reduce physical hazards and alleviate suffering while lessening economic waste, but from the viewpoint of chemists, endeavors to correct this condition have been too roundabout to be effective. They would like to get at the root of the trouble. These scientists say that the problems of sickness are essentially chemical in nature and can be radically solved. They point to their admittedly brilliant achievements since the World War as warranting their confidence that, given adequate support in systematic research and utilizing the improved technique gained in industrial lines, they could before long substantially remedy this great drain on the national wealth. In short, they hold out the hope of getting bigger business through better health, while mitigating misery, through methods as efficient as those wherewith they have helped so much in accelerating general production.

Mill Scale Taxes Steam-Line

A rubber engineer notes as very common the indifference of calender mill operators to the fact that steam cost is often much increased by allowing scale from hard water to accumulate inside the rolls. As the incrustation is allowed to thicken, heat penetration is correspondingly lessened, and to get the desired temperature steam pressure in the rolls must therefore be increased. The trouble, he says, can easily be remedied by putting into the rolls a quantity of cast iron stars such as are used in tumbling barrels, and which prevent the accumulation of incrustation.

A New Microscope-Vulcanizer

E. A. HAUSER AND M. HUENEMOERDER

The following description of a new microscope-vulcanizer and its applicability in rubber and other industries is submitted for publication upon special request of the Editor of the INDIA RUBBER WORLD, to allow American readers not familiar with the foreign language or somewhat remote literature, to become acquainted with this new type of microscopical attachment.

A CONTINUOUS microscopical observation of the process of vulcanization was for the first time published by Dannenberg[1] using an electrically heated "squeezing chamber." The impossibility of accurate temperature control as well as the difficulty of changing the temperature with any appreciable speed have been found to be considerable drawbacks of this method.

Recently Walton[2] has improved Dannenberg's apparatus by introducing a thermocouple for the purpose of continuous direct temperature control. The idea of the microscopical attachment to be discussed here was to copy the actual factory procedures, in other words, vulcanizing with the use of steam as a heat transferring medium.

The type of apparatus which has in the past month been most frequently used can be seen in Figures 1 and 2. Figure 1 shows the instrument placed under the microscope ready for observation whereas Figure 2 is a more detailed picture of this outfit. The microscope-vulcanizer consists of two steel plates containing a series of channels. Each plate is connected with a copper flexible steam in and outlet pipe. The channels in the plates are devised so that a maximum uniformity of heat transfer is insured. The two plates can be pressed together by the tightening up of three screws which can be seen in Figure 2. The lower plate, furthermore, shows a small steel needle which when properly centered will find a corresponding hole on the upper plate, thus allowing always a correct adjustment of the plates prior to applying the screw pressure.

The rubber sample to be investigated is placed between two ordinary circular cover glasses and these two are then put into a small circular steel mold consisting of an upper and lower part fitting tightly together. So prepared, the sample is then placed between the steel plates and adjusted so that the observation holes of the steel plates coincide with those of the steel mold. By these means it is possible to make use of transmitted light, which will allow a very close observation of the changes which the sample undergoes during vulcanization, as long as the section of the rubber used has been squeezed down thin enough to allow sufficient light to pass.

The whole installation is then placed under the microscope and connected with the steam inlet pipe carrying a steam gage and furthermore connected with the steam outlet pipe carrying another steam gage. The two steam gages are essential for the purpose of ascertaining the actual temperature of the microscope-vulcanizer as by radiation some heat loss will always occur. The distance between the top cover glass and the top of the upper steel plate has been calculated so that at the present moment every microscopic objective having a working distance over six millimeters can be applied. Using the strongest eye-piece available we therefore can obtain all the linear magnifications up to 350. The temperatures applicable to the present type of instrument correspond to a maximum of twelve atmospheres steam pressure or approximately 400 degrees F.

The use of the instrument for observing the vulcanization of rubber has been already discussed in various papers. We would, however, like to point out that this instrument can at the same time be applied with great advantage in the study of a variety of processes where changes through heat, with or without the addition of any special chemical, have some definite bearing on the final properties of so treated substances. For example, in work on varnishes, synthetic resins, along the lines of cellulose or nitrocellulose research, etc. The instrument can be used with reflected light, in which case the changes of alloys in the melting or cooling stages can be readily followed.

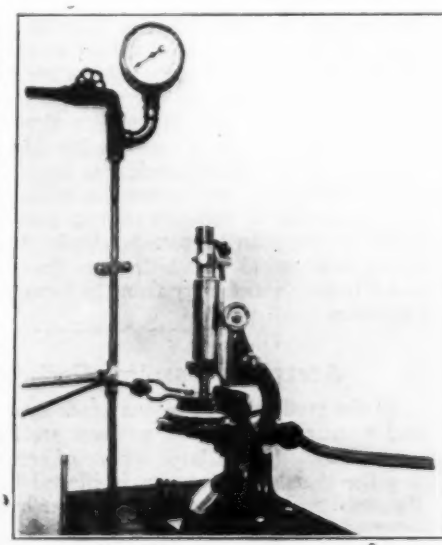


FIG. 1. INSTRUMENT PLACED UNDER MICROSCOPE READY FOR OBSERVATION.

FIG. 2. DETAIL PARTS OF THE MICROSCOPE VULCANIZER.

[1] For a detailed description of the various methods applied so far see E. A. Hauser, *Sixth Colloid Symposium Monograph*.

[2] Walton's lecture at the 76th Meeting of the Am. Chem. Soc., Swampscott, Mass., 1928.

At the present time work is continued on the lines of improving the construction of this type of instrument for the purpose of obtaining higher temperatures and especially with the idea of allowing the use of more powerful optical systems. We hope to be in a position to discuss the results obtained at a later date.

The Ford Concession

Ford Industrial Co. of Brazil Is Steadily Developing Its Concession on the Tapajos River

SOME time ago, after the terms of the contract between Henry Ford and the State of Para were published, the Brazilian yellow press started a campaign against the concession for political reasons. It is believed that certain interests desirous of frustrating the rubber planting project of Ford had a hand in this campaign. It ended very soon, however, when the criticism of the contract failed to influence the higher Brazilian authorities or the people who have an interest in the progress and development of Brazil and the Amazon region in particular. These people realize that although the natural resources of the region are unbounded, capital is needed for its development, just as the richest gold mine can only be made profitable through introduction of machinery and the employment of labor for which capital is needed.

The criticism of the newspapers was directed chiefly against certain terms of the Ford contract which were ignorantly considered as prejudicial to the best interests of the State of Para. No animosity towards Americans or the concession itself was displayed. As a matter of fact, the press of Rio de Janeiro is extremely ignorant of the whole affair.

A brief résumé of the history of the Ford concession follows: At the invitation of the Governor of the State of Para, Dr. Dionysio Bentes, Henry Ford sent his representatives to investigate and report on the possibilities of planting rubber in some region of the State of Para. After two years of study, a site on the Tapajos River was selected. W. L. Reeves Blakely, who represented Henry Ford in this matter, applied to the Governor for a grant of land in the region selected. This was promptly granted, but it was discovered that between the Tapajos River and the area obtained from the state, there was a tract of 500,000 hectares belonging to Jorge Dumont-Villares. In order to have access to the river, which is navigable for ocean going vessels, this tract was acquired from Dumont-Villares. With the 1,000,000 hectares obtained from the State of Para in accordance with the laws thereof, the Ford concession comprises some 3,700,000 acres.

The contract between the State of Para and the Ford Industrial Co. of Brazil, which was organized for the purpose of exploiting the concession, contains nothing extraordinary. It is an agreement between the parties recording the understanding reached between them, and protecting the interests of both.

The principal items of the contract are as follows: The concessionaire is accorded a term of two years in which to execute the contract for developing the land situated on the Tapajos River in the counties of Itaituba and Aveiros. Full rights of proprietorship over the land and anything contained therein are granted. The concessionaire obligates himself to plant rubber on this land at the rate of 400 hectares the first two years and 400 hectares each year for the next two years. The right of navigation for his account on the Tapajos and Amazon Rivers is accorded, a right usually reserved to steamers flying the Brazilian flag. Authority is granted to construct warehouses, docks, piers, factories, schools, and any other buildings necessary for the execution of the project. The concessionaire is further authorized to export the products of his land, whether in the crude state or manufactured, for which purpose he can establish any necessary agencies. He is exempt from any governmental supervision of his plans for carrying on the work, either agricultural, or industrial. He may establish warehouses and stores for the purpose of supplying his laborers and employes with goods. Conditioned on the approval of the State Legislature exemption is granted from all taxes, duties or other levies existing or to be created, during a period of fifty years.

After the first 12 years, the Ford Industrial Co. of Brazil is obliged to pay to the State of Para 7 per cent of the profit from the concession, and 2 per cent to the municipalities. The Government reserves the right to examine by chartered accountants all the books and accounts of the concessionaire at any time. The State of Para obligates itself to request the Federal Government to grant exemption from import duties on the importation of all materials, machinery and merchandise which may be necessary for the use of the company in carrying on manufacturing, planting or for any other purpose connected with the development of the concession.

Rights of individuals claiming ownership of any plots of land within the concession, in the nature of "squatters," are protected, although the concessionaire has the right of expropriation on payment of compensation. Any controversies are justiciable by the courts of the State of Para.

The recently organized board of directors of the Ford Industrial Co. is as follows: President, Edsel B. Ford; secretary and general manager, W. L. Reeves Blakeley; directors: Henry Ford, B. J. Craig, George H. Pickerell, Dr. Samuel MacDowell, Victor Perini, Raymundo C. Monteiro da Costa and Jorge Dumont-Villares.

Hard Rubber Holds Its Own

Offsetting a quite general impression, A. A. Drummond, M. Sc., A. I. C., says that rubber and its modifications have nothing to fear from industrial competition of synthetic resins, except where there are such essential requirements as exceptional resistance to heat and chemical influence. It has been pointed out that a breakdown voltage of 1,200 volts/mil. is a common specification, and even a 2,000 volts/mil. requirement has been met by hard rubber manufacturers, as compared with 500 or 600 volts/mil. for synthetic resins. It is also held that where synthetic resin compounds are used for radio frequencies at high voltages there is a higher dielectric constant and a considerably higher power factor, which mean at high frequencies and high voltages much loss, energy dissipation, and generation of heat. While ebonite may be attacked by ordinary solvents more readily than some of the condensation compounds, ebonite, however, withstands strong acids and alkalies better than the synthetic resins, and hence is more satisfactory than the latter for storage battery containers.

Acetylene-Gasoline Carbon Black

In the production of carbon black by a new process, air and vaporized gasoline or methane are introduced into an expansion chamber, a large volume of acetylene gas is forced into the chamber, detonation is effected before diffusion of the acetylene with the gasoline or other hydrocarbon gas has occurred, the chamber is cooled, and the cycle is repeated. L. R. Churchill (to Goodyear Tire & Rubber Co.), U. S. Patent No. 1,673,496, June 12, 1928.

Analysis of Corporation Statistics

A. T. HOPKINS
Management Engineer

A PROMINENT statistical company[1] has published a series of studies of the trends and relationships disclosed by a composite income account statement and a composite balance sheet for 545 leading American industrial concerns including four prominent rubber companies for the years 1926 and 1927.

These 545 industrial corporations had in 1927 an aggregate net profit amounting to about 2½ billions. The total net profit returned last year by all corporations in the United States probably amounted to around 7 billions. This data therefore probably represents fully one-third of the corporation data for the entire country. The corporations on the list paid nearly 2 billion dollars to their bond and stockholders last year and valued their property at more than 17½ billions. Yet in spite of this very respectable showing Table I exhibits a very marked decline in net profits for 1927 as compared to 1926.

TABLE I. COMPOSITE INCOME ACCOUNT
545 Industrial Corporations

	1926 (in Million Dollars)	1927	Per Cent Change
Net profit	$2,810.92	$2,490.26	—11.4
Fixed charges	223.46	250.24	+12.0
Net income	2,587.46	2,240.02	—13.4
Preferred dividends	259.49	241.53	— 7.0
Common dividends	1,292.07	1,389.84	+ 7.6
Total payments to security holders	1,775.02	1,881.61	+ 6.1
Carried to surplus	867.62	474.54	—45.4
Earned per $100 of invested capital	$10.6	$9.0	—15.1

It should be pointed out that the 1927 decline in profits though drastic was from an abnormally high level. In the main it must be conceded that 1927 profits, though much lower than 1926 were generally adequate. The majority of industrial concerns were able to cover their dividend charges comfortably. It will be noticed that fixed charges increased and also total payments to security holders while the amount carried to surplus was almost cut in half.

It would seem unwise for American industry to pay 80 per cent or more of its net profit to security holders as the 545 leading concerns did in 1927, but it should be remembered that four or five years of good average earnings preceded 1927; considerably more had been carried to surplus in each of these previous years than in 1927, so that the financial position of the average large industrial concern was not weak in 1927, but was extremely strong.

TABLE II—COMPOSITE BALANCE SHEET ITEMS
544 Industrial Corporations, including General Motors and U. S. Steel Corporations, but excluding Standard Oil Co. of New Jersey

	1926 (in Million Dollars)	1927	Per Cent Change
CHIEF ASSETS			
Property account	$16,455.35	$16,946.21	+ 3.0
Cash and equivalent	3,112.12	3,389 52	+ 8.9
Accounts receivable	2,547.50	2,397.59	— 5.9
Inventory	5,223.99	5,252.68	+ 0.6
Total current assets	10,883.61	11,039.79	+ 1.4
CHIEF LIABILITIES			
Funded debt	3,669.35	3,866.55	+ 5.4
Preferred stock	3,326.27	3,442.08	+ 3.5
Common stock	11,717.82	12,274.77	+ 4.7
Surplus	6,602.90	6,731.65	+ 2.0
Total invested capital	25,316.34	26,315.05	+ 4.0
Bank loans and equivalent	391.12	433.18	+10.7
Total current liabilities	2,441.04	2,411.49	— 1.2
Net working capital	8,442.57	8,628.30	+ 2.3

[1] Standard Statistics Co., Inc., New York, N. Y.

In most of the items in which there should have been improvement last year as compared with the year previous, improvement actually occurred. Property account, cash, net current assets and net working capital all showed increases. Accounts receivable and current liabilities showed decreases. Inventories remained stable.

The inclination was to borrow more money as shown by a 5½ per cent increase in funded debt and a 10⅔ per cent increase in bank loans, still it is true that total funded debt and bank borrowings represent a quite conservative fraction both of total invested capital and of property valuation.

It seems a fair conclusion that at the end of last year, the general financial condition of the average large industrial concern understudy was stronger than at any time in recent years.

It is amazing to learn that our 544 industrial concerns were carrying cash and equivalent in excess of 3⅓ billion dollars at the end of 1926 and that this asset item was increased by nearly 9 per cent during 1927 in spite of the sharp decline in profits and the increase in total amount paid out to security holders.

If all rail and utility companies have proportionate cash reserves the total cash reserves may run as high as 8 to 10 billions. The conduct of this amount of corporate cash in face of a six to seven per cent call money market is perfectly obvious.

Reduction in inventories may be attributed to hand-to-mouth buying and to the smaller total volume of business.

The ratio of current assets to current liabilities increased to 4.6 to 1.

Last year's total increase in funded debt and bank loans amounted to about 240 millions. Total funded debt of our 544 industrial corporations (many of which have no outstanding bonds) now aggregate about 15 per cent of total invested capital and some 23 per cent of total property value, not excessive figures.

The net increase in the outstanding preferred stock of these corporations, amounting to 3½ per cent, was on a dollar basis equal to about one-half of the combined increase in funded debt and bank loans. There is no evidence that preferred stock is becoming a less popular form of security issue.

Fall Meeting of the New York Rubber Group A. C. S.

THE New York group of the Rubber Division, A. C. S., will hold the first of its fall and winter series of meetings on the evening of October 10 at the Town Hall Club, 123 West 43 St., New York, N. Y.

The dinner and business meeting will be followed by a lecture on "The Manufacture, Technology and Testing of Rubber Covered Insulated Wire" by Charles R. Boggs, factory manager of the Simplex Wire & Cable Co., Boston, Mass. The prominence of the lecturer as a rubber chemist and the importance of the subject he will present will make this meeting one of especial interest alike to technical and non-technical rubber men. A large attendance outside the membership of the group is expected.

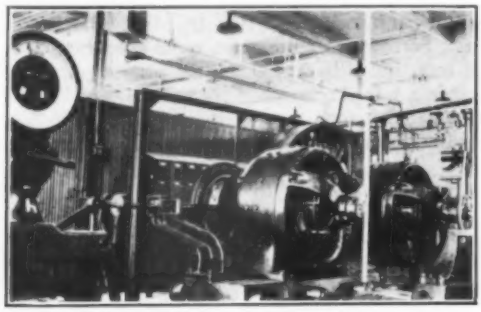
Dinner reservations at $2 each should be made as soon as possible with the secretary-treasurer, D. F. Cranor, Binney & Smith Co., 41 East 42 St., New York, N. Y.

Improved Method for Testing Pneumatic Tires

Dr. Ernest Blaker

Technical Manager, Pacific Goodrich Rubber Co., Los Angeles, Calif.

NO mechanism has been devised as yet which will serve as a substitute for an ultimate service test of the toughness and endurance of tires as revealed by their use on a motor car traversing all kinds of roads. However, the strength and dependability of the tire carcass can be proved



Sprague Tire Testing Dynamometer

in the factory. For this purpose a unique method of application of the Sprague dynamometer has been developed at the Pacific Goodrich Rubber Co.'s factory in Los Angeles, which in a much shorter time than hitherto and with more exactness, reveals every defect and fault in materials and construction such as ply separation, faults in compounding, cord weakness, etc.

Running at a constant speed of thirty miles an hour, in twenty-four hours, and sometimes 100 hours, this device subjects the tire to unusual strains (due to the method of application and the fact that no opportunity is given for cooling), over a distance which would approximate 720 miles a day. Because of the unusual conditions to which the tire is subjected, such as under inflation and overloading, the severity of the test is much greater than indicated by this mileage compared with use on the road. Mileage in the dynamometer test is equal to at least four times as much as in actual road use. Thus a tire which runs 2,500 Sprague miles gets the same punishment and service, as far as the strength of carcass is concerned, as though it had run 10,000 actual road miles.

If the tire were permitted to stay on the testing machine until it completely wore out, little or no information would be secured as to what part of the tire first gave way and it might not be possible to determine the primary cause of its failure.

Hence frequent intermediate examinations permit the laboratory experts to learn how the tire is standing up at different stages of its life.

The tire to be tested is put on a rim which in turn is placed on a chuck mounted on the shaft of a driving motor. The motor is mounted on a base which can move back and forth on a track. The tire revolves with its tread making contact with a large wheel, exactly 1/300 of a mile in circumference, mounted on the shaft of a generator forming the dynamometer unit of the tire testing mechanism. The load to which the tire is subjected is produced by forcing the tread of the tire against the wheel at a specified pressure, measured by means of a scale connected through a lever mechanism to the frame carrying the motor.

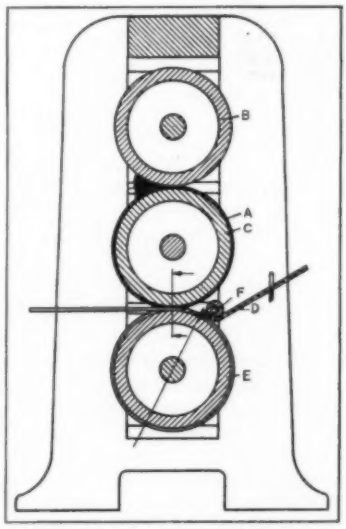
If the tire were in actual road use it would, of course, be traveling on a flat surface. The fact that it revolves against a wheel, or a convex surface, occasions a greater amount of distortion at the point of contact for a given load than would be the case on the road and thus helps to make the Sprague test more severe. To still further increase the punishment, the wheel is fitted with three crosswise humps or ridges. The tire revolving against this wheel at the rate of 30 miles an hour strikes these ridges 450 times each minute or 900 times a mile.

The generator that is driven through this mechanism develops electrical energy or power, which is of course measureable, and forms a traction load. The pressure of the tire tread against the wheel may be compared to the effect of the tires, particularly the front tires, in actually holding the weight of the car off the road. The driving of the generator is comparable to the part played by the tires on the rear wheels in driving the car along the road. A heavy wire screen placed around the Sprague machine protects the observer in case a tire should blow out while it is being tested.

Calendering Tire Cords

Process of Making Rubber Cord Sheet

THE problem of coating cords in sheet form for tire building with no weft threads whatever and at the same time maintaining a definite number of cords per inch of width in the coated material, has been accomplished by a simple patented modification[1] applicable to the bottom roll of a calender.



Calender with Grooved Bottom Roll

In the process of applying rubber to a sheet of cords free to spread apart laterally, considerable pressure is imposed upon the sheet of rubber, A, as it is formed under compression between the top and middle rolls B and C in the diagram. This pressure tends to force apart the cords of the sheet D and thus reduce the number of cords per unit of width. This action is overcome by laterally supporting the cords as they pass between the middle and bottom rolls, by providing the latter E with a groove for each cord in the sheet and utilizing pressure by a bar F extending across the face of the lower roll to guide each cord of the sheet into one of the grooves in the bottom roll. In this manner the cord sheet may be satisfactorily calendered to form a rubberized sheet which may be further rubber coated as desired.

[1] U. S. patent No. 1,674,772.

Surgical Plaster with Solution

In a new type of surgical plaster use is made of raw resin-free rubber solely. It is applied to one side of a fabric and the coated surface is talced to render it non-adhesive when not in use. Before being applied to the skin the sticky surface of the plaster is brushed with a rubber solution. D. Sarason, British Patent No. 279,030, Oct. 16, 1926.

Manufacture of Golf Balls

A Brief Description of the Manufacture and a Review of the United States Patents Relating to Golf Balls

JOSEPH ROSSMAN

THE golf ball has had a long history but has attained its present structure only in comparatively recent times. The Romans played a game somewhat resembling golf. In 1491 golf became so popular in Scotland that it interfered with the pursuit of archery much to the alarm of King James IV. He forbade the game of golf in an edict to his subjects but it appears from his personal expense accounts that he himself kept on playing golf. The first golf club was formed in this country in New York in 1888, but at that time the game was almost unheard of here. Today it is one of the most popular recreations for both young and old.

The old form of golf ball was made from leather stuffed with feathers. It was then replaced by a ball of gutta percha about one and three quarter inches in diameter. This ball although superior to the older balls did not retain its spherical shape after use and was therefore erratic in flight. The modern golf ball consists of a core made from rubber threads wound under tension inclosed by a hard rubber, balata or gutta percha cover. It has proved to be superior to any other golf ball ever made.

When the ball is given a blow the outer cover is subjected to a tension, the cover being of spherical form and containing a solid mass, the only effect produced by a blow is to change the shape of the ball from a true sphere, which necessarily stretches the outer cover. The inner layers are also subjected to extra tension for the same reason. Since there are a multitude of these highly tensioned rubber layers and all are simultaneously given an extra tension by a blow from a club, and since their reaction is instantaneous, the ball flies from the club with phenomenal speed.

In other words, the first effect of a blow upon a golf ball is usually to compress the material thereof until the limit of compression is reached, so that thereafter the implement can only impart momentum to the body of the ball without further distortion; but by having the inner ball in an initial state of high compression the preliminary work of compression to be performed by the implement is materially reduced and the time during which the implement is occupied in compressing the ball is shortened, with the result that it is enabled more effectively to impart momentum directly to the ball, while better opportunity is afforded for the elasticity of the golf ball to come into play before it leaves the implement.

A great deal is expected of the modern golf ball. Like the tire or rubber belt, it is subjected to terrific strains which it must withstand without losing structure. It is important that the ball should possess among other characteristics, durability, a high degree of resiliency, true spherical form, uniformity and compactness of structure, a center of gravity coincident with its center of symmetry, and a constant radial expansive strain upon the interior of its outer cover.

Golf balls should also possess the ability of withstanding the blows administered with varying degree of force by golf clubs; when fairly struck they should respond actively by reason of inherent elasticity, and should fly with accuracy and precision because of ballistic properties; they should be provided with a tough resilient cover capable of restraining expansive pressure inherent in the body of the ball, but not likely to be disrupted or damaged in use; they should be capable of instantly recovering normal spherical form after momentary distortion by a blow, or by forcible contact with an unyielding object of any description; and should be proof against permanent distortion under the most severe tests and usage.

To best meet these requirements it has been suggested to so construct the ball that a state of tension is imparted to the outer structure (the interior of the ball being variously constituted), and this construction has proven effective, besides serving to preserve the sphericity of the ball against forces tending to destroy the same. Golf balls have been made with a central core of vulcanized rubber or with a central core of hard material surrounded by a thick layer of vulcanized rubber which in turn is itself incased in a thick outer shell of gutta percha. Such layer of rubber has either been formed of two hemispherical cups or of rubber tapes or threads wound around the core under tension.

In the manufacture of golf balls according to patent 734,888 there is employed non-vulcanized rubber softened externally by being steeped in a volatilizable solvent, such as carbon disulphide or benzine. The softened rubber, still moist with solvent is used in conjunction with gutta percha in alternating layers which are united by the solvent forming a solid sphere. The balls are covered by a thick outer shell of gutta percha.

In the making of golf balls in which the core, constituting the larger portion of the ball, is formed of tense windings of highly-elastic rubber, difficulty arises in securing a sufficiently tense and evenly distributed winding on the inner portion of the core while using a strip wide enough to be satisfactory for the winding of the outer portion of the core.

In accordance with patent 801,813 the above objection is overcome by first making the winding strip of a tapering formation and then beginning the winding with the narrow end of the strip, the result being that the central portion of the core is formed of the narrow portion of the strip, while the outer portion of the core is formed with the wider portion of the strip.

Difficulty is experienced in making the cored balls so that the core will occupy a central position, especially when the gutta percha shell or other material is softened when compressed upon the core. It is necessary to regulate the heat since it must sufficiently soften the shell and not liquefy it so that the core floats out of its central position upon the hardening of the shell.

In patent 721,462 the core is held in the mold by four needles driven into its periphery.

It has been proposed to use a hollow core on which the rubber thread is wound. It was customary to make a hollow center of material impervious to gas or liquids and to afterward wind upon it a yarn or rubber thread which would prevent the expansion of the center. The hollow core was then charged to a high pressure with a gas or liquid by use of a hypodermic needle inserted through the winding and into the interior of the center.

Patent 1,240,439 makes a core of rubber, gelatin or celluloid. For filling this hollow center with gas under pressure, use is made of a pellet made from ammonium nitrite or a mixture of ammonium chloride and sodium nitrite inserted within the center before the parts of the core are brought together and united. Thereafter, the center is cement coated and is provided with a winding thereabout. This winding may be vulcanized rubber thread uniformly wound or of cotton or linen thread or other yarn which may or may not be previously impregnated with a rubber solution, or other cementing material.

After this winding has been completed a coating of cement or rubber is applied to the surface and a cover of gutta percha or other suitable material applied, and the entire ball is then placed in a mold for the purpose of forming or hardening the cover. The mold used may be ornamented in any manner in order to give the ball a suitable surface configuration.

It has been found that golf balls are more resilient immediately after winding than they are several hours or a few days after they are made. The reason is that the rubber strands wound about the core under tension relax gradually, relieving the compression on the core and cover. To overcome this difficulty various expedients have been tried, such for example as winding the rubber about the core under tension substantially up to the elastic limit of the strand. It has been attempted to maintain the compression by giving the core a hollow center and filling it, during the winding or after winding, with elastic fluid under high pressure.

Such a method is illustrated and described in patent 1,167,396. The first of these methods presents the difficulty of frequent breaks of the strands while being wound and still does not give the desired amount of tension on the core. The second method has the effect of expanding the strands immediately adjacent the core circumferentially and increasing their tension, but the strands at the outer portion of the winding adjacent the cover are not expanded circumferentially and are only slightly compressed radially. Furthermore, filling the core with expansible fluid such as air under very high pressure makes the ball dangerous and liable to explode when exposed to heat or subjected to an extraordinary blow.

To eliminate the above difficulties patent 1,329,311 prepares the rubber thread, which is wound on the core by stretching it substantially to its elastic limit and retaining it in position until it relaxes somewhat, assuming a new set. The strand is still further stretched and held for a time, whereby it again relaxes by reason

of its inherent elasticity. This alternate stretching of the strand and giving it a period of rest to allow relaxation, may be repeated a number of times, until the tendency of the strand to slacken has been reduced to a practical minimum.

Following the last relaxation the strands are wound about an elastic core under a tension substantially equal to that which they had preceding the last relaxation. As the tendency to relax at that tension has been practically exhausted it follows that when wound in the ball under the same tension there will be practically no tendency to relax. Thus the rubber strands will remain in the ball under the tension they had when wound therein and will not slacken after the cover is applied.

It has been found that a highly mobile core combined with an envelope of rubber tape or thread wound under high tension gives a relatively long flying ball, and the higher the tension of the winding and the greater the mobility of the core the longer will be the flight. Also, a relatively small and heavy ball flies farther than a larger and lighter one.

Liquid cores have the greatest mobility and it is common to weight the liquid with a heavy substance such as oxide of zinc. In order to hold this substance uniformly in suspension a thick, viscous or oily liquid such as castor oil, glycerin or the like is employed. But it has heretofore proven difficult to inclose this liquid in a flexible envelope of such nature that none will escape into the rubber windings and cause deterioration and loss of tension therein, and that the envelope itself shall be of uniform shape.

The most common method has been to inclose the liquid in a small vulcanized rubber bag and tie the neck. Two of these bags, one within the other and with necks opposite are often used to retain the liquid. The tying of the bag or bags makes an objectionable bunch on one or two sides, and furthermore, the use of such a core requires that the first of the rubber winding shall be applied by hand which is difficult.

According to patent 1,366,930 two flat plates of gelatin heated to the necessary degree of semi-plasticity and containing between them enough liquid to supply the core filling are located between a lower die member and an upper pressing plate, both of which are surrounded by a sleeve, the die member having a central bore. To form the core or capsule, the plate is pressed down upon the lower die member to bring the margins of the gelatin plates together and mass the liquid inwardly toward the center, then the upper die member is pressed down upon the lower one to pinch off the two halves of the envelope and press their edges together to form the seam, the apertures permitting the capsule to bulge upwardly and downwardly into the dies. The next step is to apply a rubber outer envelope which is also composed of hemispherical segments united by a circumferential seam. To do this, the core member provided with the gelatin cover is placed with its seam crosswise between sheets or plates of vulcanizable rubber, and the excess is pinched off between die members having hemispherical cavities, thereby forming the seam.

To obtain tough but flexible cover, it has been proposed to apply to the ordinary center composed of a core and tense windings of rubber thread, shaped sections of cover stock composed largely of balata or gutta percha, or both, together with a small percentage of rubber, and to vulcanize on the ball a cover composed of this stock containing sulphur and an accelerator, for example, zinc-ethyl-xanthogenate. This accelerator of the dithio-carbamic acid series, and others, vulcanize at 220 degrees F., thus avoiding any harmful effect on the tense rubber windings when applied for a comparatively brief period.

The use of a rapid accelerator under those conditions makes it possible to mold and partially vulcanize the cover during a comparatively brief period of application of the molding pressure and heat, say about six minutes, then to remove the balls from the molds and allow them to age for several days at ordinary temperature, during which the vulcanization proceeds and becomes complete. The short time in the mold increases the capacity of the molding equipment. In the practice of that method, however, difficulty has been experienced in securing a sufficiently rapid drying of the coatings of varnish or paint which are applied as a finish to the covered balls.

In patent 1,405,845 the difficulties are overcome as follows: Take a golf ball having a partially vulcanized cover composed, for example, of the above ingredients and immerse it for a period of not exceeding 45 seconds (preferably from 10 to 20 seconds) in a highly dilute solution of sulphur chloride in a neutral liquid vehicle such as benzol, thereby effecting a cold cure of the outer surface of the cover. A 1 per cent solution of sulphur chloride has been successfully used. The ball is then removed from the dipping solution and allowed to dry by evaporation of the benzol. It is then painted with the usual finishing coats, which may be an inner coating of ordinary varnish followed by several successive coats of white paint.

If the dipping in the sulphur chloride solution takes place either at once upon removal of the partially cured balls from the molds or within a period not longer than about 48 hours thereafter, it is found that the successive coats of varnish or paint will each dry over night (16 to 18 hours). If a substantially longer time is allowed to elapse between the molding and the dipping, such as six days, the drying of the coatings occurs more slowly. The rate of drying is further affected by the proportions of sulphur and accelerator used, a decrease in the amount of sulphur accompanied with an increased amount of accelerator having the effect of retarding the rate of drying. The time and temperature employed in the molding operation will also influence the rate of drying, the rate being accelerated by a longer period of curing of the cover in the heated mold, and vice versa. The following composition has given good results, the parts being by weight:

Balata	90
Rubber	10
Zinc oxide	10
Sulphur	2
Zinc-ethyl-xanthogenate	3

The above ingredients and the proportions are subject to some variation.

In manufacturing centers care has to be taken to prevent unraveling the thread. In carrying out the invention of patent 1,622,601 a center of any desired character, such as a solid center, or a bag containing a fluid, first is wound in the usual manner under more or less tension until the necessary diameter is obtained. The winding is first coated with rubber latex or some thin sticky solution, whereby the inner end of the thread will adhere thereto. After this winding, the article is subjected to a bath of latex, to which may be added, if desired, suitable fillers and vulcanizing agents.

One important advantage attained by the process is that the wound body or core, when permeated with rubber latex, becomes a practically solid mass that can be handled without danger of threads unraveling, and yet will retain the resilient advantages attained by winding the rubber thread thereon under tension.

The United States patents relating to the manufacture of golf balls have been placed into four groups. The first contains the processes of making golf balls from composite sections. The second group embraces the patents in which the filling procedure of the core with a viscous fluid is of importance. The third relates to the patents having special winding features. The fourth group contains a list of machines for winding golf cores.

Making Golf Balls from Composite Sections

1. Kempshall, 695,831. March 18, 1902. This method consisting of making a filling of gutta percha whose original bulk is too great for the capacity of the finished shell, making hemispherical celluloid segments and pressing the segments together over the filling so as to compress the latter, cause the edges of the segments to adhere and also compress the ball to final size. The elasticity of the filling or its promptness in recovering from a blow is greaty augmented by having it under compression since the outward pressure thereof tends constantly to cause the shell to assume a spherical shape.

2. Kempshall, 695,867. March 18, 1902. A process consisting of making a filling of soft rubber whose original bulk is too great for the capacity of the finished shell, and pressing gutta percha segments together over the filling causing the edges to unite and so also to compress the filling and reduce the shell to final size. Owing to the provision of the compressed rubber core, the liability to permanent distortion of the ball is avoided. By using highly vulcanized soft rubber for the filling it is enabled to withstand without injury the heating to which the gutta percha is subjected at the compressing operation. The compressed core gives an even resistance at all portions of the shell so that a reliable and uniform action of the ball is secured. The core maintains its true central position, thereby minimizing the tendency to erratic flight.

3. Kempshall, 696,368. March 25, 1902. The ball is formed by combining a spherical core of hard material with a vulcanized thick rubber envelope upon which are compressed heated hemispherical segments of celluloid, so as to compact and weld the segments and also place the rubber under compression, causing the shell to harden while under compression.

4. Kempshall, 696,886. April 1, 1902. This consists in producing a center piece or filling of gutta percha somewhat too bulky for the capacity of the finished shell, applying thereto a thick solution of celluloid in a substantially even layer of one one-hundredth of an inch, more or less, allowing it to dry so that it can be handled safely, applying a second coating of like material and allowing it to dry or harden, applying a third coating of the same material and if desired one or more additional layers, allowing the third and other coating or coatings to dry or harden, thus making an oversize ball, subjecting the ball to heat and simultaneous compression in dies, and subsequently allowing the ball to cool in the dies. Thus the coatings or layers are welded into an

integral shell, which is condensed, toughened and stiffened, and the core placed under compression by the shell.

5. Kempshall, 697,425. April 8, 1902. The method consists of inclosing a soft rubber sphere in a shell of gutta percha, putting the ball in a shell of celluloid, subjecting it to heat and compression, and maintaining the compression until the celluloid and gutta percha harden.

6. Kempshall, 699,087. April 29, 1902. The feature of this patent consists in inclosing a spherical core of gutta percha in previously formed segments of celluloid making a shell of a plurality of layers, the segments being so placed that the joint in one layer crosses the joint in another, bringing the layers to a plastic condition by means of heat, subjecting the whole to compression, and maintaining the compression while the shell cools and hardens.

7. Kempshall, 699,088. April 29, 1902. A sphere of springy material is inclosed in previously formed spherical segments of seasoned celluloid which are coated with a layer of green celluloid, the coating allowed to harden so that it can be handled, an outer layer consisting of spherical segments of celluloid placed over the coating, the joint or seam in one layer running crosswise of the joint or seam in the other layer, heating the layers, and subjecting the whole to compression.

8. Kempshall, 699,622. May 6, 1902. A process consisting in curing a thick rubber envelope upon a compressible core so that the expansion of the rubber in the curing process condenses the core, and also so that when the ball is removed from the mold the core recovers at least partially its original bulk and places the envelope under tension.

9. Kempshall, 699,623. May 6, 1902. Golf balls are produced by applying a gutta percha shell to a rubber core, covering the shell with successive layers of plastic or fluid material, and hardening each layer before the casing is applied, then subjecting the whole to heat and compression and maintaining the compression while the ball cools.

10. Kempshall, 700,656. May 20, 1902. A shell blank is formed by compacting together under heat and pressure a ply of fabric and a ply of celluloid, maintaining the pressure until the celluloid cools and hardens, cupping the material under heat and pressure, maintaining the pressure until the celluloid cools and hardens and trimming off the surplus material.

11. Kempshall, 700,657. May 20, 1902. Golf balls are made by inclosing a core of springy material in previously formed spherical segments of fabric and plastic material, providing the segments with a cementing coat, the segments being so placed that the joint in one layer runs crosswise of the joint in the other layer, bringing the plastic layers to a plastic condition, and subjecting the whole to compression.

12. Kempshall, 700,659. May 20, 1902. This consists in applying successive layers of celluloid alternating with fabric upon a core, the celluloid being applied in plastic condition and hardened or seasoned upon the ball and then subjecting said layers to simultaneous pressure and heat, and maintaining the pressure until the celluloid hardens.

13. Kempshall, 704,462. July 8, 1902. This invention makes golf balls by heating gutta percha to soften it, molding it under pressure, while heated and soft to approximate its final form, maintaining the pressure until the ball cools sufficiently to become hard, resoftening the ball by heating it, recompressing it while warm and soft, and maintaining the compression until the ball is cooled and hardened.

14. Kempshall, 704,463. July 8, 1902. The process consists in applying undersized soft rubber segments to a spherical core, drawing the segments together upon the core to stretch the rubber and also to cause the edges of the segments to meet, cementing the edges together, and compressing a hard cover upon the soft rubber sphere.

15. Kempshall, 710,198. Sept. 30, 1902. This consists in forming a rubber sphere with a cavity, inclosing the sphere in plastic material which is rendered soft by heat, subjecting the whole to compression to substantially close the cavity, and maintaining the compression while the plastic material hardens.

16. Richards, 710,368. Sept. 30, 1902. Golf balls are manufactured by inclosing a metal center piece in a sphere or layer of solid soft rubber, providing one of the center piece and sphere elements with openings; compressing upon the sphere a shell of softened plastic material, the compression being carried to an extent to at least partially close the openings, and maintaining the compression while the shell hardens, so that the soft rubber sphere is held permanently reduced in diameter by the shell.

17. Kempshall, 711,215. Oct. 14, 1902. The process consists in heating a mass of gutta percha, shaping it roughly into a round form and allowing it to cool, reheating the mass and compressing it into the form of a hemispherical segment and pressing a core within the segment, pressing a similar segment upon the core, heating and pressing the whole and maintaining the compression until the shell hardens.

18. Kempshall, 727,542. May 5, 1903. The feature of this patent consists in applying to a hard core two solid segments extending nearly around the core, and the segments matching each other and being of such size that a crevice is left between them, surrounding the segments by heated plastic material, subjecting the whole to compression to press out the segments and diminish the crevice, and maintaining the compression until the shell cools.

19. Martin, 745,213. Nov. 24, 1903. Making the coverings or casings of golf balls from a single solid or one piece shell of a cuplike section, the mouth of which is solidly closed or shut over upon the inserted core.

20. Worthington, 784,648. March 14, 1905. The two-part mold employed to shape and compress the cover is preferably of slightly larger diameter than the desired ball—say one thirty-second of an inch—and does not have the markings which are to appear on the surface of the ball. The ball is allowed to cool sufficiently to set in this mold when it is removed and the fin cut off. Then the ball is again heated enough to permit the cover to yield slightly to the internal pressure of the core but not to render it materially compressible by a mold although its surface must be plastic. This heating may be effected by shaking the ball in a wire basket over a source of heat. Then the ball in this condition is placed in a mold of the desired size having the desired markings and is compressed therein. The core is not again compressed, or at least not to any injurious extent, but the surface markings are applied. The surplus gutta percha is squeezed out between the mold halves, thereby reducing the ball to the proper size. When the surface of the cover is set the ball is removed and the fin cut off.

21. Saunders, 785,184. March 21, 1905. A process consisting in molding a pair of hollow hemispheres from suitable air proof material, softening their edges by heat to form a unitary hollow sphere, inclosing the sphere in a stiffened envelope, tumbling the core thus formed upon a hot surface, coating the envelope with a gelatinous substance, winding about the latter a fibrous shell and simultaneously incorporating therewith an adhering and weight giving substance, surrounding the latter with a coating of quick curing cement, inflating the ball thus formed with air under pressure, applying to the outer surface thereof layers of wear resisting material, and finally curing the latter under the combined action of pressure and heat.

22. Hodgkins, 788,468. Apr. 25, 1905. The method consists in converting rubber and gutta percha separately into a soluble condition, intimately admixing, cooling, subsequently boiling in water, subjecting to pressure, heating in an oven until the melting point is reached, again boiling in water, molding into balls, and covering with gutta percha in a plastic condition, and finally submitting the balls to pressure in a press.

23. Griffith, 1,240,438. Sept. 18, 1917. This consists in shaping two hollow hemispherical sections of vulcanizable plastic material having parts adapted to interlock against separation, partially vulcanizing the sections, applying a vulcanizable cement to the interlocking parts, bringing the sections together and completing the vulcanization.

24. Griffith, 1,240,439. Sept. 18, 1917. Golf balls are manufactured by forming a spherical core of sections, uniting the sections with an inclosed material capable of gasifying under heat, applying to the core a winding of textile material, surrounding the textile material with a vulcanizable cover, and heating the ball in a mold sufficiently to effect vulcanization and gasify the material in the cover.

25. Cobb, 1,270,008. June 18, 1918. Making elastic bodies having converging openings, comprises locating a hard spherical ball accurately upon a series of radical pins symmetrically placed at substantially equal distances throughout the mold cavity, surrounding the ball with moldable material, allowing the material to harden and then removing the molded body by withdrawing it over the pins.

26. Roberts, 1,329,310. Jan. 27, 1920. The process consists of forming a hollow vulcanized core, winding it with elastic strands under tension sufficient to distort the core, one zone of the winding drawing the core into a spheroid with the winding thus lying about the minor axis, and a subsequent winding about the major axis, and restoring the core to an approximately spherical form and thereby stretching the preceding winding.

27. Roberts, 1,329,311. Jan. 27, 1920. This consists of stretching a strand and winding it on a temporary holder, allowing a period of rest for the wound strand to relax, and thereafter expanding the holder to stretch the strand and again allowing it to relax (such stretching and relaxing being performed one or more times as desired) and thereafter winding the strand on a core.

28. Musselman, 1,364,576. Jan. 4, 1921. The method comprises winding a portion of the structure with a strand of rubber under tension and applying a dry lubricant such as graphite to the underside of the strand just before it reached the partially wound ball. When this ball is struck, the strands of rubber forming the ball do not cling tightly together as is the case in the ordinary

golf ball, but each strand being lubricated moves slightly during the instant of deformation and then instantly tends to return to its normal position. The result is that it is more lively and resilient than in the unyielding forms which act more nearly like a solid rubber ball.

29. Pearce, 1,366,930. Feb. 1, 1921. Golf balls are made by inclosing an oily liquid in a gelatin inner cover, vulcanizing thereon a liquid tight rubber outer envelope, applying a tense rubber winding to the outer cover, and providing a tough cover on the winding.

30. Hoffman, 1,405,845. Feb. 7, 1922. This method comprises applying to the ball a vulcanizable cover containing an accelerator of vulcanization, partially curing the cover on the ball in a heated mold, removing the ball from the mold, dipping it within a relatively short time thereafter in a solution containing approximately 1 per cent of a cold curing agent for a period not exceeding 45 seconds and then painting the cover.

31. Arnott, 1,424,191. Aug. 1, 1922. A process of balancing a golf ball having interstices consisting in floating the ball in a fluid to ascertain its lighter side and then adding loading material into the interstices in the lighter side of the ball to add weight thereto.

32. Worthington, 1,522,767. Jan. 13, 1925. Making core parts for golf balls which consists in treating balata with a volatile hydrocarbon, taking the solution and distilling off the liquid, mixing heat softened rubber and white lead with the residue, that is, with the balata extract, and thereafter wrapping the resulting mixture with rubber tape under tension.

33. Geer, 1,524,428. Jan. 27, 1925. The method of covering golf balls which comprises mixing balata or the like with sulphur, an accelerator of the dithio carbamic acid series and a light-colored pigment, forming the mixture into cover parts and applying the parts to a center of tense, vulcanized rubber windings, molding and partially curing the cover on the ball in a heated mold, removing the ball from the mold and allowing the cure to continue in air at a lower temperature.

34. Evans, Dales, Juve and Junkins, 1,530,820. Mar. 24, 1925. The manufacture of golf ball cores which comprises mixing powdered lead with glue and glycerine, molding the mixture into a pellet and allowing it to set, covering the pellet with an envelope of vulcanizable rubber, and applying heat to vulcanize the envelope and liquefy the contained mixture.

35. Maggi, 1,533.563. Apr. 14, 1925. A process of reforming golf balls which comprises simultaneously subjecting the balls to the action of steam to soften the cover layer thereof and subjecting the balls to a rolling action to eliminate inequalities in the surfaces thereof, then setting the reformed balls in a spherical mold chamber, and subsequently acting upon the balls in a press mold to provide the same with a roughened surface and effect final compression of the cover layer.

36. Penfold, 1,562,912. Nov. 24, 1925. The method of forming the outer cover of a golf ball having a rubber wound core, consisting in protecting the rubber windings on the core, applying gutta percha solution to the protected core in two successive operations to cover each half of the core separately, and thereafter molding the applied covering on the core.

37. Lewis, 1,568,513. Jan. 5, 1926. This comprises compressing elastic material between two hollow hemispherical shells of thin elastic metallic material, securing the shells together, winding elastic thread, tape, cord or the like upon the metallic shell and applying a cover over the wound material.

38. Penfold, 1,573,271. Feb. 16, 1926. A method of preparing gutta percha for the outer cover, comprises preparing a solution of gutta percha, maintaining the solution at the desired temperature, causing the solution to be deposited on a traveling band, subjecting the solution on the band to the action of a heated spreader to form a thin layer, carrying the thin layer to a point remote from the spreader so that the layer solidifies, removing the layer from the traveling band, cutting the layer as it is removed from the band into strips, and winding the strips as they are cut onto batching up means.

39. Kuhlke, 1,597,904. Aug. 31, 1926. A method for forming a hollow sphere from convolutions of wire, inserting within the sphere during the process of formation, a mass of uncured rubber having a volatilizing agent incorporated therewith, providing a cover about the sphere and vulcanizing the ball whereby the mass of rubber is converted into sponge rubber.

40. Miller, 1,622,601. Mar. 29, 1927. A process which consists in first winding upon a suitable center a rubber thread under tension to form a wound body or core, then immersing it in a bath of rubber latex thoroughly to permeate the winding, then evaporating the water leaving a practically solid mass under tension, and finally applying thereto a cover.

41. Geer, 1,626,459. Apr. 26, 1927. This comprises enclosing a wrapped center within preformed, hemispherical shells of cover material, so winding rubber thread thereon as to provide interstices between the adjacent turns of the winding, enclosing the resulting structure within a tough outer cover, and then subjecting it to heat and molding pressure whereby the cover layers are softened and forced through the interstices of the intervening thread winding to completely imbed the latter.

42. Shoaff, 1,676,841. July 10, 1928. A method of manufacturing golf ball centers which comprises compounding balata resin with vulcanized rubber, heating the compound for a period of approximately ten hours by indirect steam heat, admixing the compound obtained with a weighting material and sulphur, and molding and vulcanizing the mixture.

Filling Features

1. Richards, 696,352. March 25, 1902. A process consisting in forming a hollow sphere of firm, highly vulcanized rubber, inserting a funnel into the sphere, placing the sphere within a spherical chamber of larger diameter, heating gutta percha, causing the gutta percha to flow through the funnel into the interior of the sphere and drive out the air, preventing continued escape of gutta percha, subjecting the gutta percha to pressure so as to distend the sphere until it fills the chamber, and causing the gutta percha to solidify while under pressure.

2. Richards, 696,354. March 25, 1902. Making golf balls consisting in heating gutta percha, then forcing it through a hole into the interior of a hollow rubber sphere so as to distend the latter, then plugging the hole with rubber, and then compressing a celluloid shell upon the sphere.

3. Richards, 699,632. May 6, 1902. This invention consists in forcing into a shell consisting partially or wholly of celluloid, a heated mass of gutta percha too great for the capacity of the shell, so as to expand the latter and causing the gutta percha to harden and form a permanent core.

4. Richards, 700,154. May 13, 1902. A method consisting in providing a highly yielding sphere with a casing of gutta percha, heating the casing, injecting plastic material into the sphere to expand both the sphere and the casing, confining the sphere during such injection so as to determine the shape of the ball and causing the injected material to harden and form a core.

5. Richards, 700,155. May 13, 1902. This comprises incasing a rubber sphere with celluloid, placing the ball thus formed in a mold, heating the celluloid and forcibly injecting mobile material into the sphere to compress the celluloid and place the sphere under compression between the injected material and the shell.

6. Richards, 849,572. April 9, 1907. Making golf balls consisting in applying to a hollow elastic sphere, a plurality of loosely fitting envelopes compounded of fibrous material and celluloid, and forcing into the sphere an elastic substance rendered fluent by heat, and simultaneously imparting to the structure the desired external form.

7. Richards, 850,253. April 16, 1907. Golf balls are made by applying to a hollow spherical elastic center piece a loose envelope of gutta percha, then applying a loose envelope of fabric lined material, and finally injecting fluent gutta percha into the center piece and simultaneously imparting to the structure a spherical form externally.

8. Richards, 863,448. Aug. 13, 1907. A process consisting in forming segments of a sphere and perforating the same then uniting the segments, then forcing into the shell through the perforation sections of elastic material, and finally closing the perforation.

9. Gammeter, 1,167,396. Jan. 11, 1916. Making golf ball cores which consists in winding rubber thread under high tension over a central body of permanently mobile material, allowing the thread to relax, and then injecting further mobile material into the central body.

10. Gammeter, 1,534,104. Apr. 21, 1925. The method comprises producing a frozen pellet of normally mobile material, thereafter enclosing the material while frozen in an imperforate, vulcanizable rubber envelope, then vulcanizing the envelope, again freezing the material to the envelope.

Winding Features

1. Kempshall, 696,888. April 1, 1902. Producing golf balls by winding rubber thread into the form of a ball, winding elastic belting under tension upon the ball, and compressing celluloid shell segments thereover. The elastic belting confines the mass of rubber during the shell compressing operation, and moreover the fiber of the belting offers a material to which cellulose or other suitable cement readily adheres, so that the shell and the fiber are firmly united, thus forming an effective backing or reinforcement for the shell.

2. Kempshall, 697,423. April 8, 1902. A process consisting in winding rubber thread under tension into the form of a ball, winding elastic belting under tension upon the ball, inclosing the ball thus formed in layers of incompletely cured and well cured celluloid and subjecting the whole to compression and heat. The finished ball comprises a relatively soft elastic core, a relatively hard springy laminated shell, and an intermediate layer of tensioned elastic belting or fabric. This layer, it will be seen, forms a fibrous reinforcement for the shell itself and is of great value,

since the force of a blow is diffused and hence the ball is generally altered from its true spherical shape, whereby the elasticity of the core acts over a large area with greatly increased effectiveness.

3. Kempshall, 697,917. April 15, 1902. The feature of this invention consists in winding several layers of twine around a filling of gutta percha, applying cement to the twine, making spheroidal celluloid segments, pressing the segments together over the prepared filling so as to compress the same, and uniting the edges of the segments.

4. Kempshall, 700,655. May 20, 1902. A process in producing a golf ball consisting of making a core largely or wholly of gutta percha, providing it with a retaining jacket of fibrous material, making celluloid segments, heating the segments, forcing them over the jacketed core, welding them together, compressing the core, and maintaining the compression until the shell hardens.

5. Kempshall, 704,464. July 8, 1902. This consists in forming a body or center of overwound elastic thread under tension, applying an outer structure or shell of hard springy material, and then releasing such tension, to impart to the body a bursting tendency at all points under restraint of the shell.

6. Kempshall, 707,425. Aug. 19, 1902. Manufacturing golf balls consisting in winding in miscellaneous directions under high tension upon a center piece a multitude of layers of approximately pure acid cured sheet rubber which is drawn by the tension to such thinness that the layers pack together to form a solid body, and applying upon the body under heat and compression a cover of gutta percha, the heat and compression being carried to an extent to cause at least the outer layers of rubber to cleave to one another and also cause the outer layer of rubber to adhere to the gutta percha cover.

7. Kempshall, 707,595. Aug. 26, 1902. This comprises winding under high tension in miscellaneous directions, upon a hard spherical hollow center piece having apertures, a continuous strip of thin approximately pure sheet rubber, and forming thereon a shell of plastic material by heat and compression, carrying the compression to an extent to cause portions of the rubber to protrude into the apertures, and maintaining the compression while the shell hardens.

8. Kempshall, 713,771. Nov. 18, 1902. Golf balls are made by applying to a center piece windings of rubber under high tension, applying a shell thereto, cutting through the shell and the filling to sever the windings, applying an additional shell of softened plastic material under compression and maintaining the compression while the shell cools and hardens.

9. Richards, 721,462. Feb. 24, 1903. A process consisting in suspending a core within a spherical mold chamber of larger diameter than the core, exhausting the air from the mold, causing fluent material to fill the chamber, subjecting the fluent material to pressure and causing the material to harden while the pressure is maintained.

10. Kingzett, 734,339. July 21, 1903. The process consists in placing a strip of sheet rubber on a strip of sheet gutta percha of greater width and length, winding up the strips into a roll in such a way that the outermost layer of the roll is of gutta percha, and then squeezing the roll when heated into a spherical form, then surrounding the sphere so formed with gutta percha and squeezing the whole together when heated within a mold.

11. Kingzett, 734,463. July 21, 1903. The process of forming balls, consisting in placing a strip of sheet rubber on a strip of sheet gutta percha, winding up the strips into a roll around a central core or nucleus and squeezing the roll when heated into a spherical form, then surrounding the sphere so formed with gutta percha and squeezing the whole together when heated within a mold.

12. Kingzett, 734,888. July 28, 1903. Forming a golf ball consisting in first steeping strips or tapes of rubber in a volatilizable solvent and subsequently winding such softened and moistened strips and softened strips of gutta percha alternately around a central nucleus to form around it a series of alternating approximately spherical layers of rubber and gutta percha all united, and afterward inclosing the compound mass in an outer casing of gutta percha.

13. Martin, 745,212. Nov. 24, 1903. The manufacture of resilient high tensioned cores for golf balls from a tubular length of rubber or other elastic material, which, while in a state of longitudinal tension, is rolled back upon itself into a ring which, on the completion of the rolling process, contracts circumferentially and assumes a globular or spherical form.

14. Kempshall, 764,598. July 12, 1904. A process consisting in employing a core of hair, winding thereon a quantity of acid cured rubber under high tension to compress the core, applying on the rubber a quantity of vulcanizable material in sheet form placing the ball in a mold, and vulcanizing the vulcanizable material by the heat of the mold while pressure is maintained.

15. Richards, 777,045. Dec. 6, 1904. Constructing a golf ball by providing a pair of strips, one a perforated, ribbonlike rubber strip and the other a gutta percha strip, winding under tension the perforated rubber strip to form a core of superimposed layers, softening and winding thereon the gutta percha strip, rolling the mass, subjecting it to heat, and then subjecting the mass to pressure to mold the layers of the gutta percha strip into one integral mass.

16. Kingzett, 777,679. Dec. 20, 1904. A method of forming a golf ball having a spherical inner portion of dense but very elastic rubber consisting in heating strips of thin sheet rubber to soften them and bring them into a state in which they can be stretched to many times their original length, then extending and winding up such strips around a central nucleus into a spherical mass and subsequently inclosing such spherical mass in an outer casing of gutta percha.

17. Richards, 790,398. May 23, 1905. This consists in providing a pair of strips, one a perforated ribbonlike pure rubber strip and the other a perforated gutta percha strip, then winding under tension the perforated rubber strip to form a core of superimposed layers, and subjecting the mass to pressure to mold the layers of the gutta percha strip into one integral mass.

18. Ross, 801,610. Oct. 10, 1905. The art of making golf balls which consists in tying a hard knot in the end of a comparatively wide strip of rubber and tensely winding said strip about the knot.

19. Richards, 801,813. Oct. 10, 1905. The process of producing cores for golf balls which consists in first making a continuous elastic strip of the same or substantially the same thickness throughout its length and of tapered formation throughout, and then winding the strip under tension, commencing with the narrower end, into a core, the width of the strip increasing as the diameter of the core increases and the strip being wound under the same or substantially the same tension throughout.

20. Macneil and Macneil, 843,346. Feb. 5, 1907. The process consists in taking a solid and elastic core, winding tightly and evenly thereover vulcanized rubber windings a portion of which is treated with elastic solution, and then heating the ball so made until the outer windings and the solution become soft, then placing the ball in a mold and subjecting it to pressure, and allowing it to set, then removing and finishing.

21. Petersen, 1,115,240. Oct. 27, 1914. The method of manufacturing golf balls from balata, involving the following method steps: impregnating balata with particles of cured rubber, stretching the material to render latent its contractile qualities, shaping the material into the form of a ball, stimulating the contractile qualities of the material by the action of heat, and finally shaping the ball under pressure in hot molds, allowing it to cool while still contained within the molds.

Machines for Winding Golf Ball Cores

1. Gammeter, 647,256. Apr. 10, 1900.
2. Worthington, 740,348. Sept. 29, 1903.
3. Cochrane and Jackson, 800,076. Sept. 19, 1905.
4. Perry, 833,335. Oct. 16, 1906.
5. Mc. Daid, 838,202. Dec. 11, 1906.
6. Mc. Daid, 1,224,397. May 1, 1917.
7. Loomis, 1,242,885. Oct. 9, 1917.
8. Cobb, 1,270,009. June 18, 1918.
9. Denmire, 1,391,247. Sept. 20, 1921.
10. Loomis, 1,423,807. July 25, 1922.
11. White and Sekavec, 1,435,771. Nov. 14, 1922.
12. Loomis, 1,452,469. Apr. 17, 1923.
13. Schick, 1,468,406. Sept. 18, 1923.
14. Templeton, 1,661,860. Mar. 6, 1928.
15. Griggs, 1,661,893. Mar. 6, 1928.
16. Eldridge, 1,662,003. Mar. 6, 1928.

Decries South African Euphorbias

According to W. Spoon, noted European rubber technologist, the latex of the euphorbia trees of South Africa, recently hailed as a great potential source of rubber, contains but little rubber and much resin; the trees can not be cultivated, nor regularly tapped; and their economical exploitation is not very promising.

Dutch Native Rubber Increases

Exports of Dutch East Indies native wet rubber in June exceeded the monthly average, says *United States Commerce Reports*, thus confirming expectations that little curtailment could be looked for in native production.

Second National Highway Congress

Among the exhibitors who have submitted space applications for the exposition of The Second National Highway Congress, to be held in Mexico City, October 3, 4, 5 and 6, 1928, are the Firestone Tire Co. and the General Electric Co.

The United States Trade in Hard Rubber Goods

THE importance of the United States as a supplier of hard rubber goods is reflected in the exports during the past five years, averaging a value of $759,700. In 1923 our total export trade amounted to a value of $646,646, increasing in 1924 to $819,435 and in 1925 to $953,348, the peak year. In 1926 exports declined to $681,875, but in 1927 advanced to $697,147.

Output and Centers of Production

The value of the domestic production of hard rubber goods in 1925 amounted to $29,110,589, an increase of 16 per cent from the previous census of 1923, amounting to $25,133,680. In 1925, 38 establishments reported as manufacturing hard rubber goods, Ohio leading with 13 factories and the remaining 25 were divided among 11 states, 3 of which were east of the Mississippi River.

Local production now closely approximates domestic consumption, inasmuch as the United States exports only about 3 per cent of the total output. Imports are fairly negligible, with the exception of combs, which amounted in 1927 to a value of $328,022, 84 per cent of which was supplied by Germany. However, imports are increasing. The value for the first three months of 1928 equals $114,509, as compared with $72,599 during the like period of 1927, or an increase of 58 per cent.

Principal Markets

The export trade of the United States for recent years in hard rubber articles follows:

MARKETS FOR AMERICAN HARD RUBBER GOODS

Country	1925	1926	1927
Canada	$331,028	$221,370	$259,186
United Kingdom	299,920	172,777	160,934
Australia	60,006	70,375	58,824
Japan	26,330	27,501	36,907
Argentina	11,106	21,909	21,061
France	105,354	40,898	19,865
Mexico	23,591	14,024	12,649
Other Countries	96,013	113,021	127,721
Total	953,348	681,875	697,147

Canada is undoubtedly our best market, taking 35 per cent of the total value in 1925, 32 per cent in 1926, and 37 per cent in 1927. The United Kingdom is the second market, although export values have been declining steadily since 1925. France, which was in third place in 1925, with a value exceeding $100,000, has now declined to sixth place with a value less than $20,000. Japan is the only market increasing its purchases since 1925. Argentina, which increased its purchases in 1926, declined only slightly in 1927.

Competition in World Trade

United States exporters meet competition in the world trade with the principal manufacturing countries of Europe, particularly Germany, which manufactures a large variety of hard rubber goods. Other countries of more or less importance are Austria, Hungary, Italy, Belgium, France, and Czechoslovakia. Hard rubber articles are fabricated in Canada and Great Britain, but the greater portion is utilized for local consumption.

Recently, hard rubber goods have encountered serious competition with synthetic resin, which can be used as a substitute for hard rubber in the fabrication of many articles. The greatest competition is experienced by the product known as "bakelite," which was produced first by the Bakelite-Gesellschaft, a subsidiary of the Rue:gers-Werke Aktien Gesellschaft, of Berlin. The processes used are based on the research work of an American firm, of which it formed a part from 1910 to 1914. Besides bakelite, pyroxylin plastics are being utilized in increasing quantites as substitutes for hard rubber.

Selling Cost Still High

An Important Unsolved Problem

THE wide spread between production and selling cost puzzles many leaders in the rubber industry. "Why," asks one outstanding branch manager, who, while quintupling sales, also finds time to theorize on business, "should it be necessary to add 30 cents to 70 cents of production cost in order to sell a tire; and why could not such expense be much curtailed to the benefit of both producer and consumer?" Doubtless many others have asked similar questions about the high cost of selling, and have offered remedies, but the problem is still unsolved. It may be, too, that such cost is not always so high, but instances are known where the cost has been much more.

At any rate it is interesting to consider what might be done toward reducing the cost of disposing of rubber products, or so reducing the spread as to give maker and buyer further advantage. If suggestions for relief were invited, the first would probably be: Reduce production costs. Sounds good, yet, as a matter of fact, such costs are now close to rock bottom. Never was production more economical, and largely through time and labor saving devices and processes.

A saving through wage reduction is a last recourse. The better chance for saving would lie rather in the introduction of more effective mechanical equipment and more expeditious processes. The possibilities along such lines are far from being exhausted. So, too, when goods can be made cheaper, purchases will be larger, turnover more frequent, credits shorter, and savings in capital effected which could be shared with buyers.

Much progress has been made, but waste through insufficient standardization is still considerable. More insistent stressing of general objectives and less specializing could help much in lessening leaks in rubber manufacturing practice. Many economies have been effected in procuring raw material, but there are still too many millions tied up in cost and storage of not only crude but finished stocks, which sales retarding expense must be passed on to consumers under the head of selling cost. More rapid transportation, even greater use of motor trucking, could help to keep down inventories and thus release capital for better equipment or other means through which production could be cheapened.

The maker-to-consumer plan, perhaps with company stores, is suggested as one way of getting rid of some lost motion or duplication of effort. Some contend that advertising appropriations are rarely liberal enough, or the handling of them not clever enough to effect a sales volume that would justify lower prices. Others would "build business backward from the sale" through stimulating wants and making the factory step up to meet them, instead of depending upon high pressure merchandising to offset excessive production. All this, however, concerns itself but little with one of the most interesting factors, the human element of salesmanship, which may not be disregarded even by a monopoly.

That rubber is present in the cells of guayule shrub in the form of a colloidal suspension in the plant juices is clearly shown in the photomicrographs illustrating the leading article on page 53 of this issue.

A. C. S. Rubber Division Meeting

THE Seventy-sixth Meeting of the American Chemical Society was held September 10-14, 1928, at Swampscott, Mass. That no more delightful location for the meeting could have been selected was the satisfied expression of those in attendance. Registration of the society as a whole reached 2,000 of which fully 300 were members and guests of the Rubber Division with headquarters at the Hotel Preston.

The business meeting of the division preceded the reading of papers at the first session and the following officers were elected for the ensuing year: Arnold H. Smith, chairman; Stanley Krall, vice-chairman; H. E. Simmons, secretary-treasurer. Executive Committee: Arnold H. Smith, chairman *ex officio;* Harry L. Fisher, E. R. Bridgwater, J. R. Cadwell, C. W. Sanderson, H. A. Winkelmann.

The business meeting concluded with the unanimous acceptance of the reports of the Committee on Physical Testing, J. E. Partenheimer, chairman, and of that of the Raw Rubber Specifications Committee, E. B. Spear, chairman.

The program of the Rubber Division included twenty-two papers and two reports. This unusually large list of papers was presented at four half day sessions, one of which was devoted to a symposium on "Polymerization." This was a joint meeting of the Rubber Division and those of cellulose, leather and gelatin chemistry. The program of papers was of a high order of excellence and drew interested audiences of 250 to 300 chemists at every session. A number of papers presented were of exceptional interest and value, notably those devoted to new physical testing methods and the colloid symposium.

Rubber Division Dinner

The banquet of the Rubber Division was held Thursday evening, September 13, at the Adams House in Marblehead, overlooking the harbor. The event was attended by about 250 chemists, their wives and distinguished guests. The program bore a colored reproduction of the *U. S. Frigate Constitution* and the menu, indicated pictorially, was a typical shore dinner.

Following the dinner the gathering was called to order by the retiring chairman, Harry L. Fisher, who introduced John M. Bierer, ex-chairman of the division, as toastmaster.

Charles L. Parsons, secretary of the American Chemical Society, in a few well chosen congratulatory remarks sketched the growth of the Rubber Division, now one of the largest in the society with a growing record of accomplishment in the field of rubber chemistry and technology.

H. E. Howe, editor of *Industrial & Engineering Chemistry* in his remarks mentioned the notable success of *Rubber Chemistry and Technology* edited by C. C. Davis containing reprints of the papers presented before the division and its local groups as well as from foreign sources. He thanked the officers and committees of the division for their generous cooperation in the work of publication.

Dr. Jocelyn Thorpe, president of The Chemical Society of London, was the honored guest of the evening. He spoke on "An English Chemist's Impressions of America." He outlined his recent tour in Canada and the United States and admitted that the impressions made by it were so highly confused that they can only be untangled during a period of rest on his return home. Summed up they seemed to have been matters of size, speed and industry.

Dr. Thorpe's humorous references were much enjoyed by his audience which responded heartily throughout his remarks.

The last speaker of the evening was Reverend John Nicol Mark whose rapid fire of amusing stories preceded a most effective short talk on "The Touchstones of Success."

The Swampscott meeting will long be remembered as one of exceptional interest and success, held in most delightful surroundings, replete with impressions preserved in a bound volume containing, beside the entertainment program, sketches of notable New England chemists, educational institutions and industries.

The Northeastern Section of the American Chemical Society is to be commended for its hospitality and for the excellent souvenir program prepared and published by the enterprising rubber technologists, Charles R. Boggs, factory manager of the Simplex Wire & Cable Co., and John M. Bierer, technical superintendent of the Boston Woven Hose & Rubber Co.

Abstracts of Papers

Effect of Anti-Oxidants in Typical Rubber Stocks. Factory experience over several years has shown that anti-oxidants maintain the quality of rubber goods as indicated by other tests as well as by tensile strength and elongation. Tests are presented showing the effect of aging, with and without anti-oxidants, on tensile strength, elongation, resistance to tear, cracking in sunlight, and hand tests. Anti-oxidants retard softening during dry heat cures. Results with tire treads, inner tubes, dry heat cured goods, specification stocks, and sponge rubber are described. Artificial aging, shelf aging, sunlight exposure, and dynamometer tests all indicate the value of anti-oxidants. Aging at 90° C. in a vacuum or inert gas produced no deterioration in three typical stocks except that of overcure. The deteriorating effect of temperature, up to 90° C., in the absence of oxygen, is negligible, compared to the effect in the presence of oxygen.—Marion C. Reed.

A Practical Method for Obtaining Dry Air for Humidity Control in a Rubber Laboratory. Cabinets for the dry storage of crude rubber, unvulcanized rubber during the period between milling and vulcanization, and cured samples during the period between vulcanization and testing, are described. A description and explanation is given of the silica gel apparatus used to secure the stream of dehydrated air which is used to maintain these cabinets in a dry condition. Costs of operation are discussed and safety measures for insuring proper working of the apparatus are described.—F. S. Conover.

The Mechanism of the Reinforcement of Rubber by Pigments. Dispersed pigment reinforces by increasing the tear resistance. Flocculated pigment hardens rubber and reinforces by increasing the resistance to cutting. It may also increase the tear resistance but not to as great an extent as if the pigment were well wet. The mechanism of the reinforcement by increasing tear resistance is that the pigment particles act as obstacles that cause the tear to proceed in a longer path going around the particles. Due to the round-about path the component of the force in the direction of the tear may be small. Accordingly, it is possible in the case of a fine pigment to increase the tear resistance even though the rubber-pigment bond is much weaker than the rubber itself. The hardness of a stock containing flocculated pigment is due to the rigidity of the structure assumed by the flocculated pigment. During the early moments of hot vulcanization rubber is fluid, and the degree of wetting may be largely determined during this period; some of the pigments becoming dispersed and some becoming flocculated.—Harlan A. Depew.

A New Physical Test for Vulcanized Rubber. This test, by use of a sample of new design, subjects rubber to a combination of tensile and shearing stresses. Shear, however, is the predominating stress. The specimen is tongue-shaped. Certain aged inner tubes have been found which deteriorated more when examined by this test than a comparison of their tensile-stress-strain curves with those of fresh tubes would indicate. Tearing action seems to be approximated by the test. The effect of overcure in some cases has been recorded at earlier stages by this test than by the tensile criterion. Carbon black treads are given a much higher rating among other stocks by this test than by the usual tensile tests. The test is as easy to perform as a tensile test and checks within reasonable limits. —D. D. Wright.

The Evaluation of Carbon Blacks. The use of carbon black in an ever widening range of compounds and the introduction of new grades of blacks spoken of as soft carbon calls for a means of comparing them. Careful consideration is given to the variables liable to affect any attempt to evaluate a pigment for use in rubber and a fundamental base formula is used as a standard of reference. The quality of compounds at various pigment loadings and the range of useful loadings for a variety of commercial and experimental carbon blacks is quantitatively studied by means of the "Delta A Function."—D. F. Cranor and H. A. Braendle.

The Kinetics of the Vulcanization of Rubber. In a research on sulphur it was discovered that of all the various allotropic forms that sulphur possesses, only the amorphous or $S\mu$ form is active, that is, has the ability of reacting chemically. The crystalline varieties have no reactivity even at temperatures close to the melting point. This discovery has now been used to study the kinetics of the vulcanization of rubber which has been little understood in the past. The work by Twiss in which he tries to show that the amorphous form has no more activity than other forms of sulphur has given the author a beautiful set of data by which it is shown that at all temperatures the rate of vulcanization is dependent *only* on the *amount* of amorphous sulphur present in the mixture. An account for the effect of accelerators can be given quantitatively on this basis, the action of these being simply to increase the total $S\mu$ concentration at the temperature concerned. By the work by Skellon, Spence, and others it is shown that the vulcanization process is a zero order reaction. The significance of this is being brought out and the various factors affecting the rate involves a series of equilibria between suspended dissolved and adsorbed sulphur, as well as between the allotropic forms $S\lambda$, $S\pi$ and $S\mu$ that exist in the sulphur at various temperatures.—Birger W. Nordlander.

The Effect of Temperature on the Stress-Strain Properties of Vulcanized Rubber. A method has been devised and a machine has been developed for readily determining the stress-strain properties and automatically drawing the stress-strain curve of a rubber test piece at any temperature from 0° to 100° C. inclusive. Stocks have been mixed, given a range of cures and the stress-strain curves drawn at 0° and 100° C. and comparisons of different stocks graphically charted. The work covers the following ground: Various rubbers with sulphur, sulphur and aniline, sulphur, zinc oxide, and hexa. Also the effects of time of cure, temperature of cure, percentage of sulphur and percentage of accelerator.—A. A. Somerville.

Divisions of Colloid and Rubber Chemistry

The Colloid Chemistry of Rubber. The properties of latex including especially the phenomenon of coagulation are discussed, as well as our knowledge of the structure of latex. The characteristics of natural rubber are given, special attention being paid to vulcanization. The more important attempts to picture a structure which will account for the properties of rubber are described, as are also the x-ray investigations into the structure of the rubber molecule. The more important colloid chemical problems connected with reclaim, synthetic rubber, and dispersions of natural rubber and reclaim are mentioned.—Benton Dales.

The Dispersion of Pigments in Rubber. 2. Effect of Natural Resins and Stearic Acid. In a previous paper it has been shown that agglomeration and flocculation of pigment particles during milling and vulcanization considerably influence the degree of pigment dispersion and the reinforcing power in a rubber compound. The present investigation confirms previous results and brings out new microscopic evidence concerning the dispersive changes brought about either by substances already occurring in crude rubber or by materials that are added during the compounding. Pigments were mixed with either crude or acetone extracted rubber. These compounds were examined with regard to pigment dispersion and were then cured under the microscope, using a steam heated micro-vulcanizer under varying conditions of temperature, time of cure, etc. Interesting changes in pigment dispersion (forming the basis of this paper) were recorded either in photomicrographs or micro-cinematographically. The conclusions derived at are outlined and further microscopic research in this field is emphasized.—Ernst A. Grenquist.

Rubber Structure Research and Its Bearing on the Elastic Properties of Colloids in General. The results on structure research of rubber by the use of x-ray are discussed and effects found recently enumerated. New ideas as to the actual molecular structure of the rubber hydrocarbon are put forward and the importance of such new considerations in regard to the elastic properties of rubber is emphasized. Results obtained by the same method in the study of rubber derivatives are given to show that the difference in physical and chemical behavior of such derivatives can be traced back to a change of molecular structure as shown by x-ray investigation. The bearing of the results obtained on rubber structure research in regard to the results obtained on other elastic high molecular colloids or colloidal compounds is discussed, and finally a new hypothesis on elasticity in general is put forward.—E. A. Hauser.

The Supermolecular State of Polymerized Substances in Relation to Thin Film and Interfaces. Communication No. 361. The compounds, gelatin, rubber, and cellulose esters may be represented by the formulas: Rubber $(C_5H_8)_n$; Cellulose $(C_6H_{10}O_5)_n$; Protein $(NHCHRCO)_n$, where $_n$ indicates both an unknown magnitude and quality or kind of aggregation. The constitution of such substances is well contrasted between the "association" theory of Hess and Pringsheim and the "macromolecular" theory of Staudinger. A study of the behavior of these "high molecular" bodies in thin films and at interfaces is in agreement with Staudinger's conception of extended chains of atoms held by homopolar primary valences. The remaining interactions, i. e., orientations and condensations of these chains are effected by development of alternating polarity along the chains and consequent mutual induction. The binding forces in this case (between the chains) may vary from Van der Waal's forces to electrostatic constraints. Under the influence of dissolvents the macromolecular state may be brought to incipient dissociation—a state comparable with that postulated by the associationists. (Symposium on Polymerization.)—S. E. Sheappard, A. H. Nietz, and R. L. Keenan.

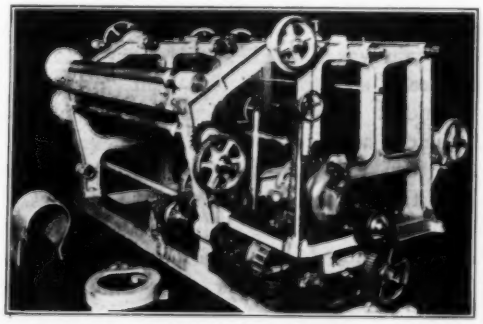
Time and Temperature-Plasticity Relations for Crude Rubber as Measured with the Goodrich Plastometer. Illustrations are given of the results obtained by the use of a new plastometer whose operation is in accord with the fundamental definition of plasticity. The linear relationship between plasticity and time of mastication for periods up to 90 minutes is shown. Data which demonstrate the variation of plasticity with batch size are given. Curves are presented illustrating the effect of temperature upon the plasticity of masticated rubber showing that there is no abrupt change in the plastic properties of crude rubber in the neighborhood of 70° C.—E. Karrer and E. O. Dieterich.

The Meaning and Measurement of Plasticity—The C. G. S. Units and a New Plastometer. An analysis has been made of the physical factor involved in plasticity. It is shown that plasticity may be considered as a simple function of hardness and of

permanent set, it being understood that these are referring to determinations under particular given conditions. A general definition of plasticity is arrived at as the susceptibility to and the retentivity of deformation and may be measured by the product of what may be termed deformability and retentivity. There is a close relationship in the final expression of plasticity with that of permanent set when one gives to permanent set definite and specific meaning which it does not always now possess. A new plastometer is described involving these principles based upon a definite deformation under given conditions where both the deformation and the total force required to make the deformation and the amount of deformation which is retained are measured in one record. A unit of plasticity is suggested as the "pla," which refers to the plasticity of a body that would deform a given amount by the application of a force of 1 kg. for 1 second, which deformation would be totally retained.—E. Karrer.

Microscopical Observations on the Vulcanization of Sulphur-Free Rubber Compounds. A new temperature recording electrically heated micro-vulcanizing apparatus for use in connection with microscopical work is described. Vulcanizing experiments on standard rubber-sulphur compounds are carried out to determine the applicability of the working method applied and results previously obtained by other research workers are checked. The vulcanization of non-sulphur containing compounds is studied and the most important differences are reported. A theory of vulcanization which correlates the effects found in sulphur and non-sulphur cures is outlined.—James C. Walton.

Some Observations on Rubbers with Low Nitrogen Content. It has been stated in the literature that nitrogen-free rubber has been prepared and vulcanized and that the vulcanizate had good physical properties. With but one or two exceptions no figures have been given for the amount of nitrogen such rubber contained. Data on the physical properties of such rubbers are also rare. The present paper describes a series of experiments in which rubber was prepared with a nitrogen content of from .003 to .009 per cent. These different rubbers were made from latex according to the method of Pummerer. They were coagulated at different pH values and the results obtained compared with another series of experiments recently carried out in this laboratory and which have already been published (I. E. C. 18 (1926) 1140). The nitrogen-poor rubbers cure normally and do not show variations in cure as the rubbers of free nitrogen content coagulated under the same conditions. It is concluded that nature and character of the proteins were responsible for the differences observed in the first series of experiments. The results of this work lend additional evidence to the fact that the proteins do not play as important a part in the tensile strength of rubber as was first thought to be the case. They do show, however, that the proteins and the various conditions in which they exist affect the rate of cure and the variability of rubber.—A. D. Cummings and L. B. Sebrell.



A DOUBLE LINING STRIPPER, MANUFACTURED BY THE SPADONE MACHINE CO., WHICH IS STANDARDLY EQUIPPED WITH A NO. 1-D REEVES VARIABLE SPEED TRANSMISSION.

How Accelerators May Disappoint

So many striking advantages have been obtained in rubber manufacturing through the use of organic accelerators, so numerous is the increasing array of such curing quickeners, and so conflicting are the claims made about their merits that many compounders have made the mistake of expecting too much and as a result have suffered keen and even costly disappointment. There are some factors and certain technique involved in using such catalytic agents that compounders may not heed sufficiently. In the selection of a suitable accelerator answers must be found for at least a dozen questions, say R. P. Dinsmore, F. I. R. I., and W. W. Vogt. For example:

SPEED. Does it work best at high temperatures (40 to 60 lbs. per sq. in.) or at low temperatures (5 to 30 lbs. per sq. in.) and how does the speed at high and low temperatures compare with other well known accelerators? HANDLING. What are its scorching tendencies at handling temperatures? Does it soften rubber? Does it disperse readily? Does it work best with high or low sulphur? NON-LOADED STOCKS. Does it give stiffness and tensile strength in stocks without pigment loading? CARBON BLACK MIXES. Does it give high or low stiffness and tensile in carbon black stocks? Is it persistent during cure? Does it have anti-oxidant properties? Do its vulcanizates stiffen upon aging? Is it suitable for air cures? How does its rate of cure in open steam compare with mold cure? Does it require stearic acid? Is it stable in uncured stock or does it lose strength?

Then there are the effects of pigments. Carbon black, for example, absorbs some accelerators directly, while clays absorb some others. Some react strongly on one another, while others ignore another in the same mix but are intensively activated by filler ingredients. Some compounders make the mistake of using too little sulphur and too much accelerator, destroying natural protective agents in the rubber and inducing premature decay; and an accelerator may be blamed unfairly. Some accelerators may readily form a sufficient sulphur reaction product to cause scorching in air but be comparatively weak in mold curings. Even raw rubbers differ in curing time with accelerators, a test showing smoked sheet quickest, brown crepe next, and pale crepe slowest.

Japan's Rubberware Imports Decline

That Japan is becoming more self-sufficient in its rubberware requirements is indicated by the United States Department of Commerce reports of imports of American rubber sundries. In 1926 Japan imported such products to the value of $169,210, but in 1927 the total fell to $137,546. The decreases in water bottles and syringes, rubber gloves, miscellaneous druggists' sundries, stationers' sundries, and mechanical and miscellaneous rubber goods offset a gain in bathing caps and toys, balls, and balloons. Japan is a fairly large producer of sundries and competes with American goods in various oriental markets on a price basis, promptly reproducing any foreign articles that are salable and filling even the smallest orders with special molds.

A limited amount of fine quality articles is imported, especially surgeons' gloves, from the United States. While American bathing caps have been preferred for their style and fast colors, the Japanese last year succeeded in duplicating those features so well that the sale of native products is likely to increase largely. A marked improvement has also been made of late in Japanese rubber bands and erasers, and manufacturers there expect to not only supply practically all home needs, but to make sales in many foreign markets. Recently they sent a canvasser to South America.

For the first time we are able to watch the process of vulcanization through a microscope. Read Hauser and Huenemoerder's rescription on page 59.

EDITORIALS

Banning Extravagant Promises

COMMENDATION is general on the decision of the Rubber Institute to substitute for the extravagant tire mileage guarantees that mail order houses and others have been offering, the fairer, sounder, and conservatively revised standard warranty. Henceforth every tire made by Institute members, who produce 95 per cent of the country's output, will be warranted against defective material and faulty workmanship not for 90 days only, as has been the practice for five years, but for the whole life of the tire. At the same time a proper ban is placed by the Institute, as has been by the National Tire Dealers' Association, on bombastic promises for the promotion of sales.

Yet while tire makers are going the limit on the standard warranty and assuring maximum quality, relatively little is expected in any such way of producers of other goods. Automobile builders, for instance, offer no time insurance against failure in materials or promised performance. Buyers depend almost wholly on the good faith of manufacturers. Even despite acute competition, car makers do not hazard a pledge that their vehicles will run any definite number of miles. Makers of thousands of other products are equally shy on making guarantees.

Why, it may be fairly asked, should tire makers be expected to do that which makers of other goods justly regard as uneconomic and unethical? Are not tire makers giving money's worth when casings have four times the endurance at scarcely half the cost of tires of six years ago? Why should guarantees, trading stamps, or other such inducements be necessary in marketing worthy, indispensable goods?

* * *

Finding Minimum Rubber Cost

INASMUCH as opportunities may be offered before long for investing in rubber planting projects under American auspices, any statistics bearing on the cost of production on the many long-established plantations in the Far East will be welcomed as essential information. Supplementing the figures recently given in this journal on numerous British rubber enterprises, and wherein it was shown that all-in costs for 1926 had ranged from 6.76 to 17.01 and for 1927 from 8.78 to 13.89 pence per pound, the McGill Commodity Service of Boston amplifies this data with interesting late returns made by three hundred rubber planting companies in the Far East.

Thus it is shown that while ½ per cent of the companies produce below 6¾ pence, 16 per cent between 6¾ and 8½, and 8 per cent between 12¼ and over 14 per cent, fully three-fourths of the companies produce within an 8¾ to 12 pence range. If weighted average for plantations producing over 1,000,000 pounds be considered, the mean rate would be 10 pence. It is explained that half of the companies with the low costs had a standard production of less, and half had more than 1,000,000 pounds output. Those that had costs of 12½ pence and more were all small producers. According to Mr. H. Eric Miller, planting authority, in 1927, all-in costs averaged 10 pence for British companies.

Often the whole story is not told by all-in cost figures. In many cases. Mr. H. Stuart Hotchkiss points out, such expense among many progressive companies also includes a large outlay for cultural work and plantation betterment that might be fittingly charged against future cost as it is designed to increase acreage yield and further efficiency, benefits which may not be fully realized for perhaps three or four years hence.

* * *

Achieving Stable Rubber Prices

CONSUMERS commonly regard competition as the sole cause of frequent and irregular price changes on rubber goods, seemingly forgetting that other factors such as scarcity or abundance of crude stock and the activities of speculators and various intermediaries may influence fluctuations considerably. The problem of the former now appears to be in a fair way of being solved through plentiful planting and unfettered selling; but as much can not be said of the problem of the middlemen who thrive in mercurial markets. Certainly the lasting welfare of producers and consumers lies in price stabilization. It is one proposition on which they can confer with likelihood of finding quick accord. The engineer who must plan and build yearns for price stability, the shop worker realizes that it spells steady work and fair wages, retailers and manufacturers know that it means something better than "profitless prosperity," and it inspires confidence among investors in rubber factory securities.

It has been well said that as industry is made increasingly transparent through searching analysis, price stability must follow as a logical sequence. Hence would the rubber trade welcome a thorough statistical survey by the Rubber Association, or other competent agency, for it should not only reveal basic economic facts through which may be achieved approximate stability of prices on finished goods, but it may also point a way toward lessening the cost uncertainty of leading raw materials.

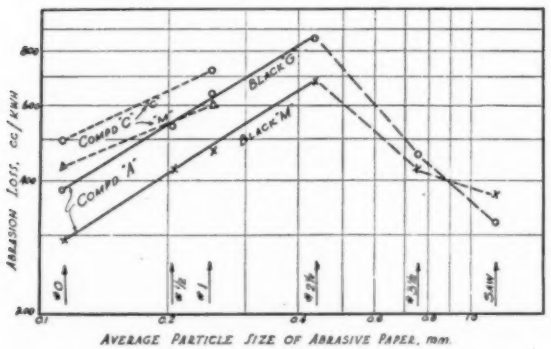
What the Rubber Chemists Are Doing

Abrasion Tests of Stocks Containing Carbon Black[1]

W. B. Plummer and D. J. Beaver[2]

THE results obtained by the authors are reported here in condensed form, and cover certain interesting facts developed during the course of a general study on the abrasion resistance of rubber stocks compounded with various types of carbon black. All tests were carried out using the Grasselli abrasion tester, as described by Williams[3], using the standard procedure described by him except that round blocks were used instead of rectangular ones. This simplifies the construction of molds very greatly and permits test blocks to be made by rolling up narrow strips of the raw stock which completely eliminates any possible effect of cellular grain on the test results and in general gives a more satisfactory test block.

Check determinations showed no difference in results between round or square blocks. The average deviation of test results for a given stock by this method has been found in general to be less than three per cent, although occasionally a given test will give obviously discordant results, ordinarily in the direction of low abrasion loss. This might result from changes in the motor speed (line voltage), in the size of the abrasive or in the condition of the abrading surface.



Abrasion Resistance vs. Abrasion Size

No detectable differences in speed were observed during tests, and although the abrasive size is important it cannot account for the occasional erratic results. These are attributable only to the condition of the surface involved, and hence in routine testing special attention should be paid to cleaning the surface of the test blocks with a cloth moistened with benzene, to insure the absence of entrained oil in the air blast used for keeping the paper clean, and to avoid the presence of accidental oily or greasy impurities on the surface of the abrasive paper. The results showed not only that it is necessary to use fresh paper for each test but that the results are a definite function of the size of the abrasive as shown in the accompanying chart.

It will be observed that up to a particle size of about 0.45 mm. the results fall accurately upon lines having the slope of 0.67. This shows definitely that with varying abrasive size the volume loss per unit of work done is proportional to the new surface generated per volume removed, since for spherical particles surface is a function of the two-thirds power of volume. It is rather surprising that this relation should hold so accurately, since the shape of the particles removed by abrasion is shown by microscopic examination to be long and stringy, rather than spherical. The results observed for abrasive sizes over 0.45 mm. are still more surprising, particularly with respect to the suddenness of the break in the curves.

Apparently, with the larger abrasive sizes new and unknown factors come into play or a new balance is set up between effective abrasive work and work lost in friction. It is also interesting to note the results obtained using the side of an ordinary 30 to 40-mesh carborundum grinding wheel in place of the abrasive paper, the loss for blacks "G" and "M" (compound "A") being, respectively, 260 and 208 cc. per kilowatt-hour. Using no abrasive but merely running the blocks against the machined surface of the brass supporting disk, a small but appreciable loss was obtained, respectively, 9.3 and 7.4 cc. per kilowatt-hour.

Energy Consumption

The total power consumption during abrasion tests, as measured in a machine of the present type, is surprisingly near to constant for given conditions of load on the test pieces, speed of the abrasive surface, etc., regardless of the actual abrasion loss of the stock under test. As pointed out by Vogt, this relative constancy of power consumption indicates that only a small percentage of the power input goes to do true abrasive work.

Abrasion Resistance of Stocks

Various carbon blacks have been compared by two methods with respect to their abrasion characteristics when compounded in rubber. In the first series of tests Grasselerator 808 was used as accelerator, the amount of which was varied to compensate for the different curing characteristics of the blacks, while in the second series a constant amount of accelerator (diphenylguanidine) was used in all compounds. The blacks used included "ink-making" black, as prepared from natural gas by the channel process as regulated with view to the requirements of the ink trades; black "M," a standard gas black as prepared by the channel process for the rubber trade; black "G," a black prepared by the combustion of natural gas in a special type of apparatus. Acetylene black, lampblack, and thermatomic carbon are products requiring no further identification for present purposes.

Series 1. The results for this series are shown in Table I. The adjustment of the accelerator was such as to give stress-strain curves of the same shape, or in other words with maximum cure at 40 to 50 minutes for all blacks except the first one tabulated, which is not used in rubber compounding but is given as of general interest. The compound with this black was obviously greatly overaccelerated in order to cure it at all. The results for the other blacks are in line with general knowledge,

TABLE I. ABRASION RESISTANCE DATA. SERIES 1.

Formula: 100 pale crepe, 5 zinc oxide, 3 sulphur, 1 stearic acid, 25 black, accelerator as noted

Type of Black	Grasselerator 808	Cure at 140° C. Min.	Modulus at 500% Kg./sq. cm.	Ultimate Tensile	Abrasion Loss Before aging Cc./kw-hr.	Abrasion Loss Aged 4 days[a] Cc./kw-hr.	Ratio Aged Normal
Ink-making black..	2.0	80	41	239	306	447	0.68
Gas black "M" ...	1.5	40	197	310	254	362	0.70
Gas black "G" ...	0.5	40	183	253	296	392	0.76
Lampblack	1.5	40	180	221	430	487	0.88
Acetylene black ..	0.5	40	184	250	329	366	0.90
Thermatomic carbon	0.5	40	101	205	430	465	0.92

[a] Aged in Geer oven at 70° C. and the abrasion test blocks run 10 minutes under standard conditions with the removal of approximately 2 mm. of surface stock, as distinct from tests run for 2 minutes only with the removal of approximately 0.4 mm. of stock.

[1] Presented before the Division of Rubber Chemistry at the 75th Meeting of the Am. Chem. Soc., St. Louis, Mo., April 16 to 19, 1928.

[2] Combustion Utilities Corp., Long Island City, N. Y.

[3] "Measurement of the Abrasion Resistance of Rubber." India Rubber World, June 1, 1927, pp. 133-4.

but are nevertheless interesting as a comparison. It will be noted that in general the blacks having the lower initial abrasion loss show the greatest percentage degradation on aging and vice versa.

SERIES 2. The formula used and the results for the second series of compounds are shown in Table II. The stock containing "ink-making" black is again obviously out of line being greatly undercured even at 140 minutes. Differences in the reenforcing power of the blacks are more noticeable here than in Table I. The fast curing (non-retarding) blacks, "G" and acetylene, show the highest stiffening effect, although black "M" definitely has the highest ultimate strength. The abrasion results are in the same general order as in the first series of tests.

TABLE II. ABRASION RESISTANCE DATA. SERIES 2.

Type of Black	Cure at 140° C.	Modulus at 500%		Ultimate Tensile		Abrasion Loss
		Kg./ sq. cm.	Lbs./ sq. in.	Kg./ sq. cm.	Lbs./ sq. in.	Cc./ kw-hr.
	Min.					
Ink-making black...	140	70	1000	95	1330	810
Gas black "M"	100	183	2600	302	4300	299
Gas black "G"	80	211	3000	243	3450	380
Lampblack	80	95	1320	184	2610	576
Acetylene black ...	80	218	3100	244	3470	416
Thermatomic carbon	80	98	1400	228	3250	464

Effect of Aging on Abrasion

The effect of the type of carbon black on aging is not restricted to one particular compound or accelerator as shown for compound "B," whose formula was 100 pale crepe, 5 zinc oxide, 3 sulphur, 1 stearic acid (25 black "M," 1.5 No. 808) or (25 black "G," 0.5 No. 808) both cured 40 minutes at 140 degrees C. The normal abrasion of the unaged stocks of compound "B" for blacks "M" and "G," respectively, was 254 and 296 cc. per kilowatt-hour. Here also, as with compound "A," the relative abrasion resistance in the surface layer of the compounds with the two blacks is reversed after aging.

It might be expected that results such as the foregoing would give a definite index of the rate of penetration of oxygen into the stock on aging. However, the reactions occurring are too complex to permit this. For example, black "G," the relative abrasion resistance of the surface layers after aging may be in reversed ratio to those of the unaged stocks. This evidently will be a decisive factor in the relative useful life of the tread if the rate of surface aging is greater than the rate of tread wear. Surface conditions or, in other words, the time of storage before use, the daily mileage, existing road and climatic conditions, etc., will determine this relation.

Summary

The abrasion loss per unit of work of rubber stocks containing different types of carbon black was determined by means of the Williams abrasion apparatus. It was found to increase as the size of the abrasive increased up to 0.45 mm. and then decreased quite rapidly. No adequate explanation for these results has been found. It was shown also that the ratio of the abrasion loss of unaged stocks containing various types of carbon black to these stocks after aging in the Geer oven was not constant, since some types of carbon black increase the rate of deterioration of rubber much more than other types.

Normal Aging of Compounded Rubber[1]

RALPH H. MCKEE and HARLAN A. DEPEW

THE authors chose nine compounds for investigation of normal aging under various conditions and after different times of storage. Their report is divided into three parts: (1) aging of cured test slabs stored under different atmospheric conditions, including wet and dry; (2) aging of rubber under strain; (3) comparative aging of cured and uncured rubber. The authors summarize their results as follows:

Part 1. Compounded cured rubber stored in a wet box has a softer stress-strain curve than when stored in a dry box. If dried after a long exposure to a moist atmosphere the tensile strengths increase by 21 to 28 kg. per sq. cm. (300 to 400 pounds per square inch).

On a basis of tensile tests, overcured rubber deteriorates faster in a dry atmosphere than in a wet atmosphere and the reverse is the case for undercures. An undercure will oxidize at about the same rate in a wet as in a dry atmosphere, but an overcure will oxidize more rapidly in the dry atmosphere as shown by changes in weight.

The change in weight of samples stored in a dry box, which excludes moisture changes, proved a good criterion of their deterioration. Each increase of one per cent in weight calculated on the rubber content showed a corresponding decrease in reenforcing properties of 50 per cent.

Part 2. The ability of zinc oxide and paraffin to protect rubber under strain against sunlight was shown and it was suggested that humidity was a factor. The protection that pigments offer against sun-cracking is the same in both paint and rubber, and the large amount of work done by the paint chemist should be studied by the rubber technologist.

Part 3. The effect of aging unvulcanized compounded rubber is to retard the cure greatly and to lower the reenforcing properties slightly. Unvulcanized compounded rubber that has lain around in holland cloth for several years is sticky and has to be milled on cold rolls, but after adding accelerator and vulcanizing a good product is obtained.

If a program on "normal aging" were being started today, other formulas would be used containing anti-oxidants that were unknown six years ago, certain new accelerators would have been used, and hygroscopic reclaim stocks would be added.

[1] *Indus. Eng. Chem.*, May, 1928, pp. 484-491.

Rubber-Cellulose Proofing Formula

THE following practical formula for a surface material for raincoats will be of interest to proofers.

DOPE SOLUTION

	Weight Per Cent
Cotton wet	12
Benzol	53
Hexalin acetate	35
	100

RUBBER SOLUTION

Raw rubber	8
Hexalin acetate	37½
Benzol	54½
	100

PIGMENT MIXTURE

Pigment	50
Castor Oil	50
	100

The spread coating is made with the following combination:

	Parts
Dope solution	25
Rubber solution	15
Raw castor oil	8
Pigment mixture	5
	53

This product when applied to cotton produces a fabric which is extremely flexible, very smooth and absolutely waterproof.

The term "cotton wet" used to designate one of the ingredients in the dope solution is not a rubber one but is fairly common in the lacquer industry. It signifies nitro-cellulose in a solution of 30 per cent by weight of denatured alcohol. The product is handled commercially in this form because of a ruling of the Interstate Commerce Commission.

Vinegaire Tar

Vinegaire tar is the trade name of a new liquid compounding ingredient. It is characterized by its strict uniformity of composition and ability to effect a snug or tight cure and a high modulus. This material by its organic acid content allows a marked reduction in the ordinary dosages of stearic acid and thus eliminates the blooming tendency caused by stearic acid used in excess.

New Machines and Appliances

Tear Testing Equipment

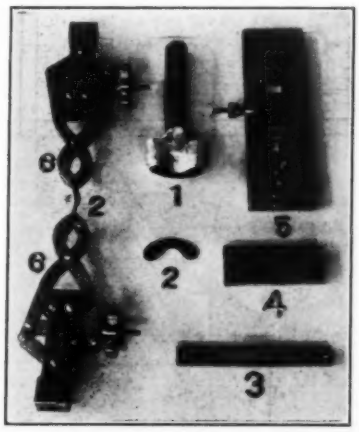
THE apparatus devised by Dr. H. A. Winkelmann for showing the load required to tear out a sample transversely and longitudinally from the sheet is here pictured.

The tear tests are made on a 3/32-inch sheet of rubber. Test pieces about 2 inches long and ½-inch wide with an outside curvature of about 1½-inch radius are die cut from the sheet both transversely and longitudinally. Five nicks or cuts are made along the middle of the inner curved edge of the piece. The test piece is held in pincer-shape jaws or grips which are attached to the regular testing machine. The jaws separate at the rate of 20 inches per minute.

The equipment consists of the following parts. The numerals refer to the figures indicating the parts pictured.

1. Punch for cutting test pieces from 3/32-inch rubber sheet.

2. Sample rubber punching ready for test.



Winkelmann Tear Tester

3. Knife holder, to hold five Gem razor blades for nicking or cutting edges of test pieces.

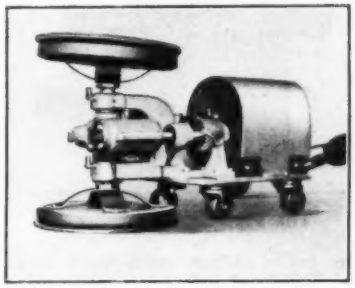
4. Depth gage faced with ebonite for accurately setting blades so all will nick the piece .020-inch deep.

5. Nicking vise consisting of a steel block into which a cavity has been milled to receive several test pieces. The cavity is so shaped that it straightens out the inner curved edges thus placing the rubber under tension while being nicked. An ebonite follower block is clamped behind the test pieces. The five bladed knife is then drawn through the guides, cutting five nicks .020-inch deep in the inner edge of each test piece.

6. Jaw shaped pincers. These jaws are fitted to the regular testing machine. The Akron Equipment Co., Akron, O.

Press Cleaning Machine

RUBBER manufacturers operating belting, packing, tiling, slab or any large smooth surface presses have always felt the need of a press cleaning machine.



Spadone Press Cleaning Machine

An electrically operated machine designed entirely for press cleaning is here illustrated. It is small, compact, operated by one man and will clean both the upper and lower platens at the same time. There are two adjustable heads resting on springs which have a very loose fit on the drive shaft, thus permitting the heads to seek a level plane, making full surface contact with the platen. These heads are each surfaced with removable disks of special abrasive paper which thoroughly cleans but does not scratch or mar the platens.

The motor and the mechanism driving the heads are mounted on a bed plate which in turn rests on ball bearing casters. The machine is guided over the press platens by means of a long handle. An extension cord which can be attached to a nearby light socket leads from this handle in which is also conveniently located a trigger switch for power control. Spadone Machine Co., Inc., 15 Park Row, New York, N. Y.

Rubber Heel Blank Press

VOLUME production of rubber heels requires rapid and accurate cutting of the mold blanks to eliminate waste. An automatic machine for this purpose is here pictured in front and rear views with plan of its arrangement in conjunction with a warming mill.

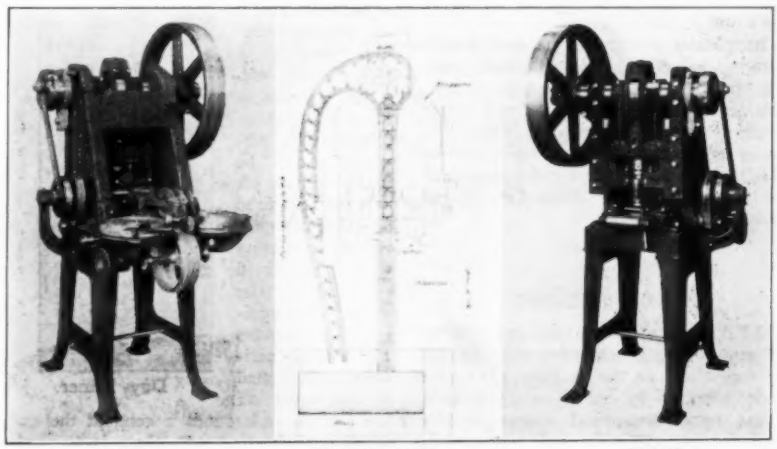
The machine is a compact power cutting press with a belt-driven flywheel on a crank shaft for giving vertical movement to a plunger carrying the cutting die.

The machine receives the rubber in a thick strip delivered from a warming mill set about three feet in front. The rubber strip comes from the mill of uniform gage slightly thicker than the heel blanks. It passes straight through the machine and in its passage is compressed sufficiently by the mechanism just before cutting to yield a blank of correct volume for closely molding a heel of definite size.

As the cut strip moves on its passes between a pair of stripping rollers. These draw the waste stock away from the heel blanks releasing the latter to drop into a cooling solution and directing the hot scrap back to the warming mill.

The scrap strip is in two parts because the intervals between adjacent heel blanks are cut through as the blanks are died.

The adjustment of volume is readily accomplished while the machine is operating,



BACK PLAN OF FEED FRONT

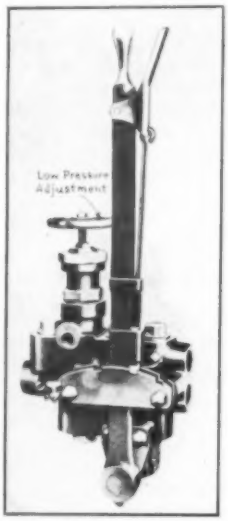
Coulter Automatic Heel Cutter

and the change from one sized heel to another, requires but two minutes. Feed for various heel lengths is automatically taken care of and is provided with means for quickly adjusting. The speed of cutting press is from 100 to 200 r. p. m. and as this speed is controllable by the operator, the output of the press will be determined largely by the speed of the mill.

The volume of the heel blanks can be regulated to within one-half gram produced at the rate of 200 to 275 pairs per minute. The Automatic Machine Co., Bridgeport, Conn.

Semi-Automatic Press Valve

MANY hydraulic press installations in rubber plants are being operated from a two-pressure accumulator system—a low pressure line for rapidly closing the presses and a high pressure line for actually performing the work. Such an arrangement effects a saving in power unless the high pressure is wasted by careless operators doing the low pressure work.



HPM Press Valve

The new valve here pictured eliminates the possibility of such waste. The operator sets the valve in the pressure position applying low pressure, and the shift to high pressure is made automatically as soon as the pressure demand of the press reaches the low pressure limit.

The picture represents the new poppet operating valve with this automatic pressure control. The valve is a rigid self-contained unit for operating single acting cylinders from a two-pressure system and it required no extra parts, check valves or outside piping to complete it for operation. The Hydraulic Press Mfg. Co., Mount Gilead, O.

Steam Purifier

CLEAN dry steam is very essential for maintaining effective and constant curing conditions in the making of rubber goods whether by mold or open cure. Unless some mechanical means is provided for automatically and continuously separating all water from the steam, the steam to the superheater or to the steam headers will be wet, as well as impure. The ordinary so-called "dry-pipe" is not actually a dry-pipe; it is merely a collecting, or distributing pipe.

The purifier here pictured not only combines the function of the so-called dry-pipe, by collecting the steam from a material

The Pipe Line Tracyfier

length, but in addition automatically scrubs every particle of moisture from the steam which leaves the boiler nozzle absolutely dry and clean. It not only removes all moisture from the steam but, even of more importance, removes the impurities that the moisture carries.

The apparatus illustrated is built for use in pipe lines up to 2½ inches. It contains regular size baffles and makes use of the same operating principle as that used in boilers generating a total of over 3,000,000 boiler horsepower. Andrews-Bradshaw Co., Division of Blaw-Knox Co., Farmers' Bank Bldg., Pittsburgh, Pa.

Automatic Timer

THE automatic computing timer here pictured was especially designed to regulate the time of mixing of dough for bakers' products but can be adapted to time any mechanical operation such as cement mixing, press work vulcanizing, etc. The instrument operates electrically and the current can be turned on or off as often as desired for taking temperatures or testing of the mixed product. The timer automatically computes the various periods of actual mixing, cuts off the current and sounds a gong at the expiration of the time set. There is no clock to wind or other adjustments to make as the setting of the dial automatically winds the spring. It is only necessary to move the pointer to the desired position, pull down the switch and the timer is in operation. The J. H. Day Co., Cincinnati, O.

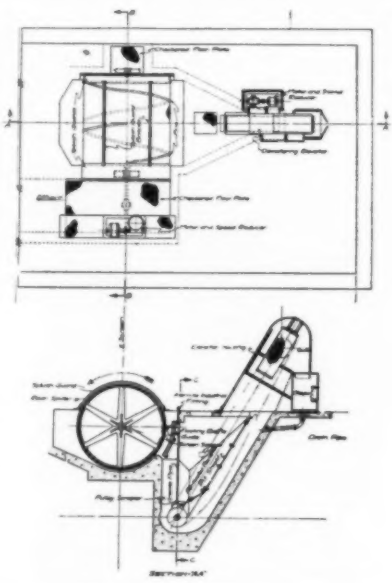
Day Timer

Device for Saving Waste Reclaim

THE prolonged washing necessary to clean reclaim after its treatment in the digesters of the alkali process will of necessity carry away much fine rubber unless special means are provided to arrest the waste. A most effective method of preventing this loss is by means of the apparatus here indicated in plan and elevation.

All of the washings from the digested reclaim is fed through this apparatus for screening out the rubber which is returned to the plant for further processing by means of an air ejector.

The equipment consists of a self-cleaning screen, 3 feet in diameter by 3 feet long, equipped with a 30 mesh wire cloth backed up by a ½ inch square mesh screening. The drum of the screen is driven by a 2 h. p. motor which is directly connected by a worm geared speed reducer. The screenings are collected in a screening pit and are removed contin-



Plan and Elevation of Dorr Screen

uously by an elevator with perforated buckets to facilitate drainage of the solid matter. This elevator is driven by a 1 h. p. motor directly connected to the shaft by a worm geared speed reducer and silent chain. The bucket elevator discharges into a pneumatic screen ejector having a capacity of 15 cubic feet.

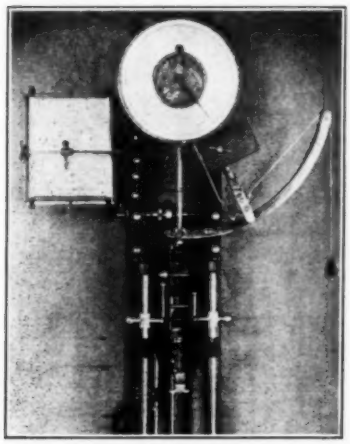
The screen will actually remove about 60 per cent of the total solids in the waste water. Those solids which are not recovered are extremely fine and are of only secondary value from a reclamation standpoint. In one installation this recovery makes it possible to return to the plant for reuse about 2,000 pounds of rubber stock per day from a flow of about 14,500 gallons of water per hour. The Dorr Co., Inc., 247 Park Ave. New York, N. Y.

Improved Rubber Tester

THE modern practice of reporting tensile tests of rubber stocks in terms of tensile per square inch, and the use of the "dumb bell" or broad end samples of small dimensions calls for a tensile test machine which will automatically compute from the results of the tests of the small size sample. There is also need for a stress strain diagram showing, by the various curvatures of the lines of the test, exactly the action of the stock under tension.

These requirements of rubber testing are met by a practical and simple arrangement described and illustrated below.

This machine is equipped with a new type gear box, so arranged that when the machine is reversed after sample is broken, the lower clamp returns instantaneously to the starting position. The pulling member of the lower jaw is of the endless chain type which does away with drilling



Scott Improved Testing Head

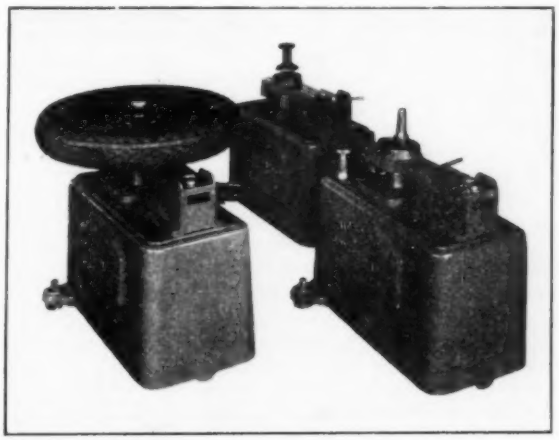
a hole through the floor or otherwise providing clearance. This particular model of machine is adaptable largely for tensile and tear tests of rubber. It is arranged to be driven by individual motor of 1/6 h. p. and can be furnished with a head of any capacity up to and including 0 to 200 pounds maximum capacity. Usually a compensated head is required of 0 to 150 pound capacity adjustable to ranges of gage from 40 to 120 inclusive.

The recorder used with this machine is of the electrical type. A spark controlled by a conveniently located switch usually operated by the foot is projected from the pointer through the paper onto the platen. The hole thus burned through the paper registers the load at the particular elongation at the time the circuit was completed by the operator.

On completion of each test, the platen is moved a small distance by turning the hand screw provided for the purpose so that the next sample burns a separate line of holes and in this way fifty or more tests can be taken on one sheet of paper, with each test a clear and concise record. Henry L. Scott Co., Blackstone and Culver streets, Providence, R. I.

Micro-Poise Balancing Machine

A NEW machine for balancing automobile tires is shown in the accompanying illustration. It operates as follows: The tire to be balanced is placed on the machine and the operating lever



Micro-Poise Balancing Machine

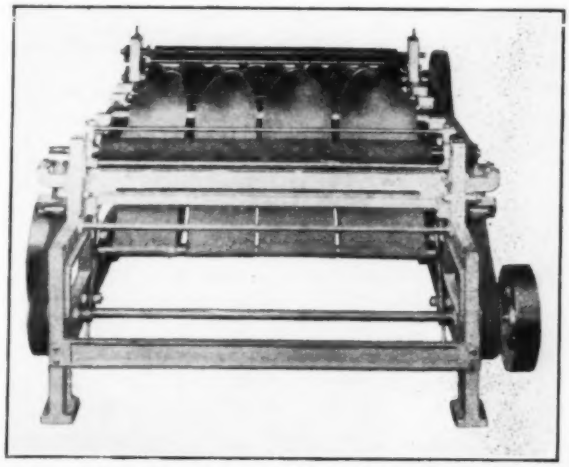
moved when a universal level shows instantly the angle of unbalance. Weights are placed on the rim to compensate for the amount of unbalance, the size and location of which are then marked on the tire. The wheel is then removed and the weight attached.

Due to the fact that there are a limited number of holes provided in the rim for attaching the balance weights, it is sometimes necessary to attach more than one weight at spots on the periphery. The machine is peculiarly adapted for this purpose, for when balancing wheels the weights can be so disposed on the rim as to produce perfect balance despite the fact that there are a limited number of points on the wheel for attaching the weights. This machine is capable of balancing 60 wheels per hour in the hands of an expert operator. Commerce Pattern Foundry & Machine Co., 2211 Grand River Ave., Detroit, Mich.

Inner Tube Folding Machine

THE tube folding machine here illustrated takes cooled calendered tube stock and folds it into a butt splice tube closely resembling a tubed tube. The new folder takes calendered stock that has been cooled in the liner after a day or two and folds it into a butt splice tube with a uniform gage. Using the cold stock eliminates the danger of tube creasing which often occurs when stock is run while still hot. The folder can be operated at a speed of 24 feet per minute delivering approximately 7,000 tubes in 10 hours and requires only one operator, who also can cut the tubes to length.

The principal advantage claimed for the machine is that the stock can be calendered and allowed to age a short time before being folded. The machine is manufactured with either four or five belts, the four belt equipment being for larger size tubes and five belt installations are for folding small cross-section tubes. The Akron Standard Mold Co., Akron, Ohio.



Akron Standard Tube Folder

Editor's Book Table

Book Reviews

"Latex," by Henry P. Stevens. The Rubber Growers' Association, Inc., 2 Idol Lane, Eastcheap, London, E. C. 3. Paper, 66 pp. 5½ by 8¾ inches, illustrated.

This pamphlet written by the eminent consulting chemist of The Rubber Growers' Association was prepared to give those interested in working with latex such authoritative information as they need at the start. The contents comprises chapters on source, production and conversion of latex into rubber; composition and stabilization; concentration; manipulation and compounding, vulcanization of latex and latex products; the application and products of latex; abstract of latex patents and selected bibliography.

"Seventy-Sixth Meeting of the American Chemical Society under the Auspices of The Northeastern Section, Swampscott, Massachusetts, Sept 10-15, 1928." Flexible covers 77 pp. 6¼ by 9¼ inches. Portraits, illustrations and 2 maps.

This book is a souvenir of the seventy-sixth meeting of the American Chemical Society. It contains, beside the list of officers of the society, of the northeastern section and committees for the meeting, the entertainment program, an account of the lives and work of 14 New England chemists, followed by articles on the industries of New England, the points of historic interest from Cape Cod to Concord and the universities, colleges and scientific schools of New England. The volume is bound in genuine du Pont fabrikoid, a rubber product which is at once handsome, durable and waterproof. The printing of the book was executed at the plant of The Simplex Wire & Cable Co., Cambridge, Mass.

"Rubber." New illustrated monthly published by Newton & Co., 110, Strand, London, W. C. 2, England.

The main object of the new publication is to inform and stimulate the interest of rubber shareholders and the general public in regard to the manifold and increasing uses of rubber. It is non-technical in character and is copiously illustrated. Herbert Standring is actively associated with this publication.

"Commerce Yearbook 1928." Volume I. Issued by the Department of Commerce. Bound in buckram. Charts tables.

This volume contains all essential data bearing on the economic life of the United States during the calendar year. The comprehensive character of the yearbook is indicated by its contents which include a résumé of general business conditions; survey of important developments in connection with production, employment, domestic distribution, and foreign trade; sections dealing with production, prices, market conditions and foreign trade in specific industries; and studies of fuel and power, transportation, banking, etc.

"Practical Color Simplified," by William J. Miskella. Practical Finishing Series, Vol. I. Finishing Research Laboratories, Inc., Chicago, 1928. Boards, 113 pages, 6 by 9¾ inches. Indexed. Illustrated, including tables, colored plates, and color charts.

This volume is the first of a series of practical discussions on finishing processes. Quoting from the author's preface "This particular book on color as related to the finishing industry contains all of the general and important information on color choosing, color mixing, color matching, and color harmonizing incidental to practical finishing."

Color finishing in the rubber industry is gaining in importance and appreciation since the introduction of low temperature curing accelerators which has made available the full range of brilliant organic colors in rubber work, particularly for raincoats, shoes, bathing caps, toys, novelties, etc. The rubber chemist will find in this volume systematic instruction on the principles of color and their practical application.

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THE EFFECT OF VULCAN COLORS ON THE AGING OF RUBBER GOODS. Dr. Rudolph Ditmar, *Gummi-Zeit.*, 1928, Vol. 42, No. 46, pp. 2,519.

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SAFETY DEVICES FOR RUBBER ROLLERS. N. H. van Harpen. *Archief.*, 1928, Vol. 12, No. 6, pp. 388-402. Illustrated. English, pp. 403-409.

New Publications

"Zinc Pigments" issued by The New Jersey Zinc Sales Co., New York, N. Y., is a 27 page pamphlet punched for insertion in a pocket looseleaf cover. It is devoted to description of the many brands of the company's products followed by useful tables of bulking values, warehouse and shipping information.

"Breeze" is the name given to the house organ of Van Cleef Bros., Woodlawn Ave. and 77th St., Chicago, Ill. As its name implies, it is filled with breezy items relative to the activities of the plant and its numerous employes.

Railroad Facts, No. 6, is a yearbook of railroad information published by the Western Railways' Committee on Public Relations, Chicago, Ill.

"Falk Flexible Couplings, Bulletin 180." This illustrated pamphlet of 16 pages contains information not included in the issue it supersedes and it lists one additional size of coupling, the 20-1/2C. It also contains a new list of service factors which have been reduced to allow for the selection, in most cases, of smaller and hence less expensive couplings. It describes the CS type developed particularly for close coupled applications and also the CH type added to the standard line for high speed turbine work. Both these types retain the same operating principle as the standard series which are particularly adapted for absorbing shocks and compensating for misalinement of coupled shafts.

"Proposed United States Government Master Specification for Braided Water Hose" and **"Proposed Revision F. S. B. 39 b. United States Government Master Specification for Rubber Tubing."** These specifications in the formative stage are submitted to representative manufacturers for their comment and criticism and any others interested. The Federal Specifications Board will gladly receive any comments and suggestions as to changes which may be thought to be desirable in the specifications.

Better Rubber for Beer

Much of the rubber tubing used in breweries is quite unsuitable, according to Bode and Bausch, German technicians. They absolve the rubber in brewer's hose from any blame for the "rubber taste" in beer and ascribe the taint to the presence of certain factice material. They also contend that an excess of fillers, such as lime carbonate or magnesium oxide, causes tubing to become porous, rendering it likely to carry infection not easily overcome. The inside of tubing in contact with wort or beer, they hold, should contain not over 15 per cent of rubber substitute, not over 30 per cent filler, and not less than 60 per cent pure gum.

Rubber Abrasive Wheels

A New Process of Manufacture

GRINDING wheels and similar abrasive articles made by the usual methods of mixing are sometimes defective. For example, those in which the abrasives are incorporated in a rubber solution base may show porosity after vulcanization while those made from ordinary mill mixed stock cannot be given a different grade by varying the amount of rubber since two wheels having different amounts of rubber but subjected to the same vulcanization treatment will have the same grade of hardness.

Porosity is eliminated and varying degrees of hardness are secured by a new process[1] as follows:

A mixture consisting of appropriate quantities of crude rubber sulphur is made, abrasive material in the form of grains is added together with an agent preferably beeswax adapted to modify the properties of the rubber so as to change the grade of the vulcanized article.

By grade or hardness is meant that relation between the rubber bond and the abrasive grains characterizing their resistance to separation from the rubber bond. The stronger the adhesion of the grains, therefore, the harder the grade and the weaker, the softer. This adhesion of abrasive to rubber can be controlled and regulated to a large extent in accordance with the new method to produce an article of any desired grade or hardness.

In practice a compound may be prepared by mixing together 65 parts of crude rubber and 35 parts of sulphur on mixing rolls. To each pound of abrasive grains of any desired grit size are added together with about one-eighth to about three ounces of beeswax. The abrasive and wax are added in small amounts as the compound is being mixed. Disks cut from the fully compounded stock are then vulcanized in molds.

Grinding wheels made in accordance with the invention have met the requirements for snagging and certain grinding operations where an exceedingly fine finish is desired, more satisfactorily than by wheels produced by other methods.

[1] U. S. Patent No. 1,676,190.

Mechanization Helping Workers

THAT greater mechanization of industry is not increasing unemployment nor impoverishing the working population, as some have recklessly claimed, is plainly proved by statistics, according to the National Industrial Conference Board, Inc., which also declares that recent reports of unemployment have been grossly exaggerated. While there has been a decline in personnel needed in some manufacturing lines, it is held to be small as compared with the constant expansion of employment in other fields as a result of increasing production and the development of new industries. The nation as a whole, and especially its wage earning class, has been steadily improving its economic status. The national income increased from $33,200,000,000 in 1914 to $77,313,000,000 in 1925, an effective increase of nearly 40 per cent after allowing for price changes. During the period of most intense mechanization, 1914 to 1927 inclusive, bank savings, building and loan assets, and life insurance premiums have risen 223.9 per cent, or a per capita increase of 164.4 per cent, or allowing for increase in living cost, a net of about 64 per cent.

It is pointed out that if the United States had not so generally adopted mechanization, coordinating with the alertness, ingenuity, and forethought of its industrial leaders, it would not be holding its premier position in the world, standards of living would not be as high, comforts would be fewer, and the lot of the wage earner would not be as fortunate as it is today. By shifting the lower functions of labor to automatic, power driven machinery, the benefits of production are now more widely enjoyed and a better type of worker and a more homogeneous population are being positively evolved.

New Goods and Specialties

Household Gloves

The Faultless Rubber Co., Ashland, O., has just added some new numbers to its line of household gloves, which are heat cured under water. They show a high tensile strength and will not deteriorate in stock, and, according to the manufacturer, will last longer in service than any acid or vapor cured glove. The gloves are free from odor, pleasing in appearance, soft and flexible. They are made in three grades: Reliance, a good durable medium

weight; Non-Pa-Reil, heavier in weight; and Wearever, the heaviest and best quality glove.

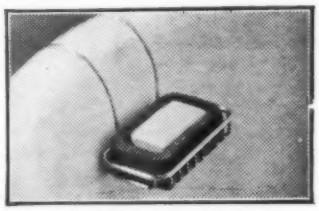
Strap Sandal

A new number in sandals for the youngsters has a summery appearance that makes it unusually dressy for the little girl. The upper is made of a novel blue and red print on a sand colored background, with matching sand colored outsole and foxing and a red bind. The manufacturer is the Hood Rubber Products Co., Watertown, Mass.

Child's Sandal

Soap Dish

A soap dish that may also be used as a sponge for cleaning the basin is the product of the Rubbersan Products, Inc., 229 E. 38th St., New York, N. Y. When used as an insert for wire dishes, the soap will not fall out and the dish will always be clean. Unlike china or metal, it will not slip and it cannot break, and the ease with which it may be cleaned makes it an indispensable article for the bathroom, kitchen, pantry and laundry. The dish is



Rubbersan Dish

made in three colors: moss green, buttercup yellow and Parrish blue.

Novel Alarm Clock

It is said that an alarm clock has been invented by a German which will quite effectively rouse the heaviest sleeper and prevent a return to slumber. A rubber ball, attached to the alarm, is released at the appointed hour and bounces on the head of the sleeper, and keeps bouncing until the alarm is turned off.

New Oxford

The Independent Rubber Co., Ltd., Merriton, Ontario, Canada, is offering a

Merida

very attractive oxford for women which is made of sunburn color duck. It is a three eyelet tie with a tan saddle strap, imitation welt, Ruf-gum sole and wedge heel. It is known by the trade name of Merida and has had a wide sale.

Striking Galosh

A galosh which combines both style and usefulness, the Black Diamond, is announced by the Servus Rubber Co., Rock Island, Ill. It is made with a black silco top and black and white cuff. A bright finish black sole and foxing completes this striking new gaiter. The heel is fashioned for military, high heel, and nature last.

Black Diamond

Tethered Golf Tee

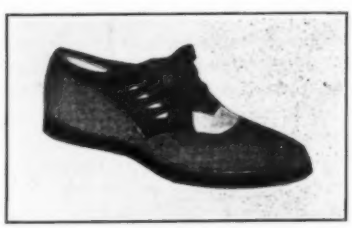
The new Murray tethered golf tee is a novel and practical item supplied in three sizes, ½, ⅝ and ¾ inches. It is made of red rubber with hollow center and solid concaved head. The tee is so light that it offers practically no resist-

Murray Tee

ance when struck by the club, yet is strong enough to withstand many rounds of golf. The anchor peg is made of hardwood, enameled yellow, the point being long enough to secure it firmly in the ground. The head has a groove in it in which there is a celluloid ring, allowing the cord to rotate instead of becoming tangled when the tee is struck unusually low. The tee is tethered to the peg by means of a green elastic cord fourteen inches long. The Murray Co., Duluth, Minn.

Colored Sport Shoe

To harmonize with the gay clothes prevalent today, the Dominion Rubber Co.,



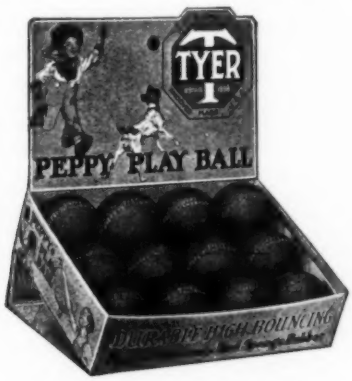
Siren

Ltd., Montreal, Canada, has created several new models of attractively colored patterns. The tie shown in the illustration, the Siren, is made with a green covert upper, Stroller tan cutout quarter and tan foxing. A green crepe sole further emphasizes the color combination and presents a classy oxford as serviceable as more conservative patterns.

For additional information regarding these articles write New Goods Dept., INDIA RUBBER WORLD, *420 Lexington Ave., New York, N. Y.*

Play Ball

The Peppy play ball is made of red sponge rubber and has a remarkable re-



bound. It is 2½ inches in diameter and weighs 3¾ ounces. The ball is uniform and holds its shape perfectly. As it floats, it may be used for water sports. The manufacturer is the Tyer Rubber Co., Andover, Mass.

Shock Absorber of Rubber

An interesting exhibition was given at the White City Speedway Track, London, of a new type of rubber bumper for motor vehicles, the design of a German airman, Herr Franzarl Schleiff. Its general principle is to transmit shocks in a lateral direction, which is accomplished by the use of clips and shears. The bar is four inches in diameter, made of specially prepared rubber attached to the car by movable steel arms. The buffer may be fitted on the front and back of vehicles. In the demonstrations given, one car driven at the rate of 35 miles an hour collided with another going 5 miles per hour, both fitted with the bumpers, and the rubber bars took most of the shock passing it on to the movable steel brackets. Ordinary glass fittings were used in the tests and none were broken.

Rubber Heels

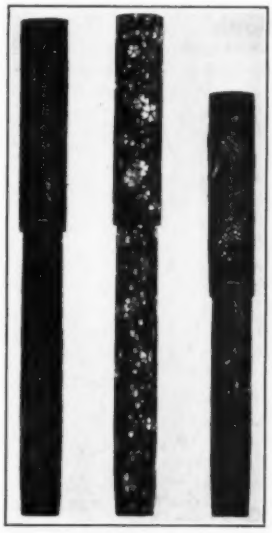
The B. F. Goodrich Rubber Co., Akron, O., has added rubber heels to the list of its products. Springy, tough, enduring, perfectly balanced and cushioned is the description of this number given by the manufacturer. They are made in two colors, black and brown, and are designed for both the kiddies and grownups.

Colored Rubber Gloves

A novelty designed to appeal to the busy housewife and help eliminate the drudgery of dish washing has been recently marketed in the form of colored rubber gloves. Bright and cheerful shades of blue and green with a peach lining have been found, it is said, to appeal to the feminine buyer more than the prosaic red color with which she has long been familiar.

Entire Rubber Heel

A rubber heel has recently been designed to take the place of the entire leather heel, and is, of course, much lighter, more resilient, comfortable and durable than the latter. It will appeal particularly to the manufacturer because of the saving in time and labor usually expended in lift cutting, building, compressing, etc. Replacement of the worn heel will be a simple matter for the repairer.



Makie Pens

Lacquered Fountain Pens

Adapting the Makie (raised lacquer work), which Japan has so successfully developed, to the prosaic fountain pen and transforming that everyday article into a work of art, the Namiki Mfg. Co., Ltd., Tokyo, Japan, and 40 Rector St., New York, N. Y., offers a large variety of beautiful designs, several of which are shown in the accompanying illustration. Some difficulty was experienced in finding a lacquer which would not fade when applied to the ebonite foundation of the pen, but, after many years' experimentation, Laccanite was originated, which is beautiful in appearance, unaffected by weather conditions, and which retains its luster indefinitely.

Tennis Ball Marking

An ideal indelible marking for tennis balls has been patented by F. H. Ayres, Ltd., 111, Aldersgate St., London, E. C. 1, England. By this process letters or figures are introduced into the cloth in such a manner that wear it or soil it as you will, the marking is there right through to the rubber core.

Rug Anchor

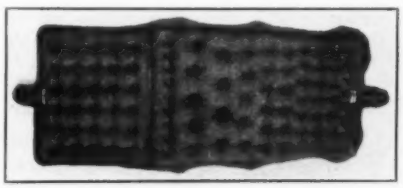
DuPont is now making a fabric, Rug Anchor, which when placed under the rug holds it securely in place and prevents slipping, however highly polished the floor. A small sample of the material used as a test illustrates its effectiveness. With the coated side down on any smooth surface, the hand may be pressed in a downward, forward pushing pressure and the material retains its hold on the surface and will not move.

Bather's Headrest

A recent invention placed on the market by a German inventor, is designed for those who like to enjoy the morning bath in comfort and leisure. A padded headrest, the pillow section of which is covered with a rubberized material, is provided with two straps. Pneumatic buttons placed at the end of these straps hold the headrest in the desired position by the force of suction against the surface of the bathtub.

Pneumatic Cushion

A new light pneumatic seat cushion that can be carried when deflated in a pocket, can be inflated by mouth or pump, and is self-ventilating, is called the O-So-Soft. A quilted effect is obtained in vulcanizing by causing the opposing sides to unite only on the edges and at many spaced round points on either surface, thus forming depressions when the cushion is air-filled. Types include boat seats convertible



O-So-Soft

into life preservers, airplane double seats, and aero pilots' seats, one of the latter being shown herewith. Eno Rubber Corp., 1726 S. Los Angeles St., Los Angeles, Calif.

Financial and Corporate News

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Aetna	Pfd.	1¾% q.	Oct. 1	Sept. 14
Aetna	Com.	$0.50 q.	Oct. 1	Sept. 14
Akron R. R.	Pfd.	$2.00 q.	Oct. 1	Sept. 20
Boston Woven H. & R.	Com.	$1.00 ex.	Dec. 15	Dec. 1
Cambridge	Pfd.	1¼% q.	Oct. 1	Sept. 20
Dominion	Pfd.	1¾% q.	Sept. 30	Sept. 21
Dunlop	7% Pfd.	$1.75 q.	Oct. 1	Sept. 30
Faultless	Pfd.	1¾% q.	Oct. 1	Sept. 14
Faultless	Com.	$0.50 q.	Oct. 1	Sept. 14
Firestone	6% Pfd.	1½% q.	Oct. 15	Oct. 1
General	6% Pfd.	1½% q.	Sept. 30	Sept. 20
Goodyear (Canada)	Pfd.	$1.75 q.	Oct. 1	Sept. 15
Goodyear (Canada)	Com.	$1.25 q.	Oct. 1	Sept. 15
Goodyear (Canada)	Pfd.	$1.00 ex.	Oct. 1	Sept. 15
Hood	7% Pfd.	$1.75 q.	Nov. 1	Oct. 20
Hood	7½% Pfd.	$1.88 q.	Nov. 1	Oct. 20
India	Pfd.	1¾% q.	Oct. 1	Sept. 20
Mohawk	Pfd.	1¾% q.	Oct. 1	Sept. 26
Seiberling	Pfd.	$2.00 q.	Oct. 1	Sept. 20
Seiberling	Pfd.	2% ex.	Oct. 1	Sept. 20

Akron Rubber Stock Quotations

September 21, 1928

Company	Bid	Asked
Akron R. R.	17⅜	21¼
Akron R. R., pfd.	..	95
Falls	..	8¼
Faultless	30½	32
Firestone	175	183
Firestone, 6% pfd.	109½	110
Firestone, 7% pfd.	108½	109
General	175	..
General, 6% pfd.	94½	98½
Goodrich	81½	82½
Goodrich, pfd.	109½	110½
Goodrich, 6½s	107½	108½
Goodyear	66½	67½
Goodyear, 1st pfd.	97	98
Goodyear, 5s '28	99¼	99⅞
Goodyear, 5½s '31	100½	101
Goodyear, 5s '57	91¾	92¼
India, com.	55¾	55¾
India, 7% pfd.	..	97
Mason	..	¾
Mason, pfd.	..	9
Miller	22	23
Miller, 8% pfd.	82	84
Mohawk	210	225
Mohawk, 7% pfd.	..	93
Rubber Service	..	37
Seiberling	50½	51
Seiberling, 8% pfd.	101	105
Star	..	5
Star, 8% pfd.	..	8

New York Stock Exchange Quotations

September 20, 1928

Company	High	Low	Last
Ajax	8¾	8¼	8¾
Fisk	11½	11⅛	11⅜
Fisk, 1st pfd. (7)	63	63	63
Fisk, 1st pfd. cv. (7)	63½	63½	63½
Goodrich (4)	83½	82⅛	82⅛
Goodyear	68⅛	66¼	67½
Goodyear, 1st pfd. (7)	97½	97½	97½
Intercontinental	10½	9½	10½
Kelly-Springfield	22	20¾	22
Kelly-Springfield, 6% pfd.	70	70	70
Kelly-Springfield, 8% pfd.	70¾	70	70¾
Lee	19½	19	19½
Miller	22⅝	22½	22½
Norwalk	5⅜	5¼	5⅜
Norwalk, pfd.	48	48	48
U. S. Rubber	39¼	38⅞	38⅞
U. S. Rubber, 1st pfd.	69¼	69	69

Substitute for Chicle Gum

A substitute for or an auxiliary of chicle, as for use in chewing gum, is a new combination of a synthetic resin and an aldehyde. The resinous or gummy material is made by reaction of vinyl acetate, vinyl formate, or other suitable vinyl ester with a saturated aldehyde, aliphatic or aromatic, under heat and pressure, with or without an inorganic acid or other catalyst. In one type of composition vinyl formate interacts with formaldehyde and with an acetaldehyde. H. W. Matheson (to Canadian Electro Products Co., Ltd.). British Patent No. 280,247, November 8, 1926.

New Incorporations

Golf Club Inlay Mfg. Co., Sept. 1 (New Jersey), $50,000. M. Pitney, T. L. Widmayer, and F. A. Frost, all of 763 Broad St., Newark, N. J. Principal office, 588 Broad St., Newark, N. J. To manufacture inlays of rubber, etc.

Halpern Tire Co., Sept. 1 (New Jersey), $125,000. I. G. Halpern, 184 Water St., W. Brandwein, 365 Oak St., and T. Blitzer, 139 Lewis St., all of Perth Amboy, N. J. Principal office, 175 Smith St., Perth Amboy, N. J. To manufacture truck and pneumatic tires and tubes.

New Jersey Rubber Mat Corp., Sept. 6 (New Jersey), capital stock 200 shares no par value. J. Siegmeister, 444 Clinton Place, S. P. Pressler, 195 Ridgewood Ave., and J. Cohen, 26 Commerce St., all of Newark, N. J. Principal office, 26 Commerce St., Newark, N. J. To manufacture and deal in rubber and rubber products.

Old Guard Rubber Corp., Sept. 5 (New York), $100,000. A. P. Howes, 213 Ridge Road, G. F. Covell, 36 E. Newell Ave., both of Rutherford, N. J., and K. B. Spencer, Hotel Manger, New York, N. Y. Principal office, 19 Vestry St., New York, N. Y. To manufacture and deal in mechanical rubber goods.

Pleasantville Products Co., Sept. 1 (New Jersey), capital stock 500 shares no par value. S. J. and S. W. Clark, and R. K. Lempkin, all of 205 Washington St., Pleasantville, N. J. Principal office, 205 Washington St., Pleasantville, N. J. To manufacture automobile tires and other accessories.

Swerling Trading Corp., Sept. 12 (New York), capital stock 6,000 shares no par value. S. Swerling, 44 Whitehall St., M. Lippman and N. I. Sachs, both of 285 Madison Ave., all of New York, N. Y. Principal office, 44 Whitehall St., New York, N. Y. To import and deal in crude rubber.

Standardizing Crude Rubber

A rubber manufacturer lately complained to a crude rubber importer that although he had ordered only the clean and better grades, not a single lot reached him that did not have to be thoroughly rewashed; in fact, he believed that he gave it the first and only washing it had received. The advice given was to pay more and get choice estates rubber. The buyer still fails to see why he should pay more than a fair price for clean rubber, and he irks at the disadvantage at which he is placed through not getting what he orders and pays for.

Of course, such loss on the part of the consumer could be averted were the crude material not merely graded but definitely standardized as are the essentials in the cement and many other industries. There appears no good reason why exact standards should not be set up and adhered to for thickness, folding, and casing of sheets, for weight of cases and contents, and for methods insuring freedom from dirt, nails, splinters, etc.; and closer specifications might well be made concerning physical and chemical characteristics of crude rubber as are provided for other raw materials. If the grower has to conform to such requirements he will soon find a way of raising and treating rubber which will not only lessen the grief of many manufacturers but also enhance his own position in the trade.

Rubber-Lined Fermenting Vessels

Vessels for fermentation to produce acetone and buty alcohol, or for other purposes, are formed of riveted steel plates lined with sheeted rubber vulcanized in place is an invention of M. A. Adam. United States patent No. 1,672,743, June 5, 1928.

Novel Rubber Piston Packing

In a new type of piston packing a cylindrical core of rubber is surrounded with a mixture of babbit, graphite, and oil, and with an outer protective covering of fabric. Hampton P. Rhodes. U. S. Patent No. 1,674,839, June 26, 1928.

The Rubber Industry in America

Helped Great Rubber Companies to Success

Charles W. Seiberling has the unusual distinction of having helped several rubber companies to develop from modest beginnings to conspicuous success, but withal he is one of the most unassuming executives in the industry.

Born January 26, 1861, at Western Star, Summit County, O., he was educated in the Akron public schools and at Oberlin

Blank & Stoller, Inc.,

C. W. Seiberling

College, Oberlin, O. His family being interested in the making of agricultural appliances, he took up this line in 1881, became superintendent of J. F. Seiberling & Co., harvesting machinery manufacturer, and remained in that capacity up to 1895. In this year he became interested in rubber, joining the Akron India Rubber Co. and continuing as secretary until 1898.

In the latter year his famous brother, Frank A. Seiberling, organized in a small way the Goodyear Tire & Rubber Co., destined to become one of the giants of the industry, and Charles W. became its secretary and vice president, remaining with the corporation until 1921 when he and his brother quit the concern on its reorganization. Later in the same year when the Seiberling Rubber Co., of Akron was organized with Frank A. as president, Charles W. became vice president and later the treasurer, and these offices he still fills most efficiently. He is also president of the Seiberling Latex Products Co., of Akron.

Mr. Seiberling is a member of the Ohio Society of New York, Akron Chamber of Commerce, Barberton Chamber of Commerce, United States Chamber of Commerce, and Ohio State Chamber of Commerce. His business address is Seiberling Rubber Co. and his home is at Northfield, O.

THE FALK CORP. HAS APPOINTED B. W. Rogers representative for Akron with offices at 225 Central Savings & Trust Bldg.

Ohio

The American Tire & Rubber Co., Akron, O., is continuing its tire business and adding to dealers' accounts. The present management remains intact with Floyd Snyder president.

India Tire & Rubber Co., Akron, O., elected W. G. Klauss president of the company to succeed J. M. Alderfer, who has been promoted to the chairmanship of the board of directors. Mr. Klauss was formerly connected with the Johns-Manville Co. and the Federal Match Co. of Chicago, having served as president of the latter company.

Charles T. Grant, vice president and director of the Miller Rubber Co., Akron, O., was unanimously indorsed by the Summit County Bar Association for appointment as U. S. judge in the Northern Ohio federal district.

The Society of Safety Engineers has been organized by safety engineers connected with Akron industries. It is affiliated with the national safety movement and its purpose is to promote safety in industries as well as communities. The officers of the Akron branch are: Jack Kidney, Goodyear Tire & Rubber Co., president; Walter L. Schneider, The B. F. Goodrich Co., vice president; Howard Low, Miller Rubber Co., secretary; C. L. Hungerford, Firestone Tire & Rubber Co., treasurer.

The Lowenthal Scrap Rubber Co.'s three reclaiming plants at 156 Clewell Ave., East Akron, O., were destroyed by fire, causing an estimated loss of $50,000. Two tanks on adjoining property, each containing 150,000 gallons of gasoline, were threatened, and it was feared that the whole vicinity would suffer. The Lowenthal company operated a rubber scrap and reclaiming plant.

Dr. L. B. Sebrell has been appointed manager of the research department of the Goodyear Tire & Rubber Co. He replaces A. M. Hamblett, who recently resigned.

The Goodyear Foremen's Club was addressed by Clinton E. Slusser, vice president and factory manager of the company, at its opening fall meeting, September 15.

The Leo Meyer Co., Akron, O., has taken over the Alligator Mfg. Co., Oklahoma City, and will continue the Alligator line of blowout patches. Albert Buxbaum, president of the Meyer company, together with his wife and family, will motor through the East during the month of October.

White & Co., Akron, O., carries a complete line of crude and reclaimed rubber, raw materials and the Whico line of softeners.

F. A. Pope, president of the Cleveland Liner & Mfg. Co., 5508 Maurice Ave., Cleveland, O., is receiving the congratulations of his many friends on the arrival of a grandson, Alton Rask. The baby is the son of Ervin Pope, production manager of the Cleveland company.

The B. F. Goodrich Co., Akron, O., has awarded a contract for the construction of a nine-story finished goods warehouse to be erected on Falor St. The building will be of steel and concrete construction faced with brick and will be the fourth largest manufacturing building under one roof in Ohio, it is said. This job will be a part of an expansion program which will reach between $4,000,000 and $5,000,000 before the end of the year, according to T. G. Graham, vice president.

The Landers Corp., Toledo, O., has been organized through the merger of the Landers Bros. Co., the Toledo Auto Fabrics Co. and the American Buckram Weaving & Finishing Co. The corporation is listed as a $1,000,000 company.

A. B. Dunbar has been made sales manager of the Triangle Tire & Rubber Co., Canton, O. Mr. Dunbar was formerly connected with the sales force of the Goodyear Tire & Rubber Co.

The Barr Rubber Products Co.'s plant at Sandusky, O., was completely destroyed by fire on Sept. 6, resulting in a loss of about $250,000. Millions of toy balloons and other rubber novelties were consumed in the flames, which were impossible to get under control because of the vats of chemicals employed by the company.

R. A. McCorkle has been appointed manager of the manufacturing sales department of the Miller Rubber Co. in place of F. C. Millhoff, who recently resigned. Mr. McCorkle will make his headquarters at the home office in Akron but will take active charge of all manufacturers' work both in Akron and Detroit. He will be assisted by C. H. Russell who will make his headquarters in Detroit.

The Kemitex Rubber Co., it is reported, will move its plant from Barberton, O., to the building formerly occupied by the Rex Rubber Co. at Wadsworth, O.

Henry F. Shippel, formerly tire superintendent of the Canadian Goodrich Co., Ltd., and recently in charge of the Goodrich tire design department at Akron, O., has been assigned to the engineering work of the aeronautical division of The B. F. Goodrich Co. Mr. Shippel will be remembered for his discovery of the volume increase of rubber under strain and for his notable paper on tire stresses.

Fyre-Freez Demonstration

A demonstration of Fyre-Freez extinguisher, a method of extinguishing fires without spoilage, was held in Akron, O., Sept. 20. About 300 officials of rubber factories and members of the Akron Fire Department were present. Large tanks filled with gasoline and lacquer were ignited and allowed to burn about 20 seconds. The fire was extinguished with Fyre-Freez in less than 10 seconds.

A series of six tests was made with highly inflammable materials such as alcohol, gasoline, and lacquer which demonstrated satisfactorily the practical method of extinguishing fires with this new equipment.

The demonstration was in charge of the Fyre-Freez Corp., New York, N. Y., and Edward Hutchens, president, Utility Mfg. Co., Cudahy, Wis.

F. C. Millhof, for sixteen years general sales manager of the Miller Rubber Co., Akron, O., and more recently manager of the car and truck manufacturers' sales, has announced his resignation from the company. Mr. Millhof has made no announcement of his future plans further than that he intends to take a much needed rest.

The Akron Industrial Foundation, at a recent meeting, elected P. W. Litchfield, president of the Goodyear Tire & Rubber Co., one of its directors.

Harvey Firestone, Henry Ford and Thomas A. Edison, it is said, have signified their intention of participating at a tremendous "America First" celebration to be staged in the little village of Elizabethton, Tenn., when Herbert Hoover speaks there on October 6.

The General Tire & Rubber Co. has opened a new distributing branch and service station in Cleveland, O., at Chester Ave. and East 21 St. C. F. O'Neil is manager.

The Triangle Tire & Rubber Co., Canton, O., reports business very good. I. G. Baughman has been made general manager of the company.

Removing Rubber from Insulated Wires

In a recent issue of the *Gummi Zeitung*, St. Reiner recommends the following method of removing rubber insulations from wires: The rubber cover is first removed from both ends of the wire, after which ends are mounted on a wire testing machine and the wire slowly stretched. This reduces the diameter of the wire, and the rubber cover loosens. When taken out of the machine, the insulation can easily be taken off by hand. It is claimed that even in cases where the rubber is firmly vulcanized to the wire almost its entire length, or where the wire is quite thick, this method works. If no wire testing machine is available the Schopper rubber testing machine can be used.

THERE IS ONE AUTOMOBILE TO EVERY 5.1 persons in the United States of America.

Goodyear Executive Who Has Risen Rapidly

Harry E. Blythe, vice president and factory manager of the Goodyear Tire & Rubber Co. of California, is one of the younger rubber executives who has won his place in his chosen line through sheer merit and close application. Born in Canton, O., June 23, 1890, he graduated from the Canton High School in 1909 and from Mt. Union College in 1913.

Harry E. Blythe

At the latter he became noted as a baseball and football star. His mechanical training was first turned to account in 1913 when he became an erecting engineer for the Alliance Machine Co., Alliance, O.; next he was stock clerk, receiving, and acting shipping clerk for the Timken Roller Bearing Co., Canton, O.; and later was again erecting engineer for the Alliance Machine Co.

Attracted by the tire industry, he entered the service of the Goodyear company at Akron, serving first in the automobile tire department and next becoming branch manager and acting district manager at Denver. He was then made production department manager of the Goodyear Flying Squadron, and later headed the efficiency department of the Industrial University and the personnel department of the Goodyear works in Akron. Further promotion came in 1921 as factory manager of the Goodyear plant in Los Angeles and vice president of its operating company. With Factory Superintendent William Stephens, of Akron, in 1926 he visited Europe to survey manufacturing and distributing conditions. In June of this year he was called to Akron to become assistant to President Paul W. Litchfield of the parent Goodyear Tire & Rubber Co.

While in Los Angeles Mr. Blythe became vice president of the United States Building & Loan Association, president of the Hollywood Country Club, director of the Southern California Golf Association, and member of the El Cabellero Country Club and the University Club. He is a Mason and also belongs to the Sigma Nu Fraternity. His address is: The Good-Fraternity. His address is in care of The Goodyear Tire & Rubber Co., Akron, O.

Akron Brokerage Established By Alex Schulman

A complete brokerage service in crude and scrap rubber is offered by the new firm of A. Schulman, Inc., recently established by Alex Schulman at 521 Second National Building, Akron, O.

A twelve years' connection with H. Muehlstein & Co., during seven of which he acted as manager of its Akron branch, qualifies Mr. Schulman to successfully operate such a brokerage. A native of Akron, and a graduate of its schools, he has made many friends during his business career because of his straightforward methods and pleasant personality.

Mr. Schulman will be assisted by George Woloch, with whom he was associated while in the employ of the Muehlstein company.

Miller Enters Into Agreement with British Firm

The Miller Rubber Co., Akron, O., and the Industrial Rubber Manufacturers', Ltd., 191-192 Tottenham Court Rd., London, W. 1, England, have entered into an agreement whereby the Industrial company is licensed to manufacture Miller tires in England for distribution in the British Isles. This does not affect Miller's Akron plant which will continue to manufacture tires for distribution throughout the world with the exception of the British Isles.

By the terms of this license agreement, the Miller company is in a position to furnish British made tires to the British colonies without the heavy initial investment necessitated by the establishment of manufacturing facilities in England.

Road Essay Contest

The $4,000 scholarship in the national essay contest on "The Relation of Improved Highways to Education," conducted annually by Harvey Firestone, president of the Firestone Tire & Rubber Co., was awarded to Verona Daniel Hardey, 15, of Gulfport, Miss. Her essay was selected from the thousands submitted by high school students.

Goodyear to Grow Rubber in Philippines

The Goodyear Rubber Plantation Co. has applied for a license to grow and harvest rubber on the Island of Mindanao, southern Philippines. The company is capitalized at $6,000,000 and is controlled by the Goodyear Tire & Rubber Co.

Corporations, according to Philippine laws, can only acquire a maximum of 5,000 acres but a representative of the company hopes to negotiate with the government for the lease or purchase of a larger acreage.

Rubber Salesman With Wide, Varied Experience

Frank Payne Harrington is noted in the trade as a salesman who certainly knows his rubber, and he came by such knowledge only through close study, hard work, and varied experience. He was born in Akron, January 9, 1885, and, after graduating from the Central High School, received a good grounding in rubber fundamentals at the Buchtel Preparatory School, Akron University.

F. P. Harrington

In 1901 he got his first practical acquaintance with rubber manufacture as sales clerk with The B. F. Goodrich Co., and soon became branch office manager. From 1911 to 1920 he was accessory sales manager for the Miller Rubber Co.; from 1920 to 1923 acting sales manager for the Dayton Rubber Mfg. Co.; during 1923 and 1924 he was director of sales for the Star Rubber Co.; from 1924 to 1926, eastern sales manager for the Polson Rubber Co.; and from 1926 he has been manager of accessory sales for the General Tire & Rubber Co. Mr. Harrington is a Mason and his home is at 486 Avalon Ave., Akron, O.

Survey of Dealers' Stocks

Questionnaire forms for the new survey of dealers' stocks of automobile tires and tubes made by the Rubber Division of the Department of Commerce, are now ready and will be mailed from the department during the last week of September.

Each firm or individual receiving this form is requested to complete it on October 1 and return it to the Bureau of Foreign and Domestic Commerce in the enclosed envelope, for which no postage is required. Promptness is essential. If form is received after October 1, report should be mailed immediately. All reports will be held strictly confidential. Results of this survey will be given prompt publicity in leading tire and automotive trade journals and in the press.

U. S. Imports

The total imports into the United States during 1927 amounted to $4,185,000,000. Raw silk leads the list at a value of $390,000,000, with crude rubber second having a valuation of $340,000,000.

New Jersey

Rubber conditions throughout New Jersey continue to improve and orders are increasing in all lines of goods. There has been a noted improvement in the hard rubber line, some of the mills reporting a 50 per cent increase. Factories producing hose and belting are rushed with business. Orders are also increasing for tires and tubes. Heel and sole factories are running normally. Reclaiming plants report business as being good.

The Joseph Stokes Rubber Co., Trenton, N. J., is experiencing a very busy season and the plant is now being operated twenty-four hours a day. Sales have increased considerably and the company expects to increase its working force. A new plant addition, 100 by 96 feet, has been erected to take care of increased orders. Plans are now being drawn for a new machine shop. The concern predicts a prosperous year.

The Mercer Rubber Co., Hamilton Sq., N. J., reports that its plant is running normally. Frederick R. Sayen, secretary of the company, has returned from an extended trip through Europe.

The Luzerne Rubber Co., Trenton, N. J., states that business shows a little increase.

The Pocono Rubber Cloth Co., Trenton, N. J., is very busy at the present time and is operating with a night shift.

Atlantic Products Corp.

The Atlantic Products Corp., Trenton, N. J., has been formed by local capitalists as the result of the phenomenal growth of a sideline industry developed by the Pocono Rubber Cloth Co. within the last four years. Two years ago Theodore S. Cart, former secretary of the Pocono Rubber Cloth Co., established a golf bag factory in a part of the Pocono plant as a means of using up mill ends of rubberized fabrics. It was started in June and during the remainder of the year 12,000 golf bags were manufactured and sold. A year later 47,000 golf bags were manufactured. An addition was built and last year 90,000 golf bags were made. Then it became apparent that the rubber cloth and the golf bag business needed further expansion, and Mr. Cart purchased the golf bag end of the business. The capital thus raised was used to expand the Pocono company.

Mr. Cart then organized the Atlantic Products Corp. with himself as president, Robert C. Roebling, vice president, Harry Gihon, Francis G. Cart and Austin C. Cooley, as members of the board of directors. The company leased a plant on Muirhead Ave. and expects to turn out 150,000 golf bags this year. The Atlantic company also manufactures racquet covers for the tennis trade, shopping bags, rain jackets and camping blankets. At the present time the company is employing about 70 hands.

Whitehead Bros. Rubber Co., Trenton, N. J., reports capacity production. The company is particularly busy in the hose department where the men are working overtime.

Clifford H. Oakley, president of the Essex Rubber Co., Trenton, N. J., has returned with his family from Cape May, N. J.

C. A. Yoos has been appointed midwest representative for the **Murray** Rubber Co., Trenton, N. J., and is now located at the Murray office, 601 West Randolph St., Chicago, Ill.

H. A. Dornseif, general sales manager of the Murray Rubber Co., Trenton, N. J., spent eight weeks on the Pacific Coast. He visited all the branches of the Murray company.

The Combination Rubber Co., Trenton, N. J., announces that several new representatives have been appointed in Colorado, Texas and on the Pacific Coast. The company reports increasing business and the opening of several new accounts.

The United & Globe Rubber Co.'s, plant at Trenton, N. J., was placed on sale Sept. 7 for unpaid taxes, amounting to nearly $3,000. There were no bids on the property and it was sold to the City of Trenton. The plant was abandoned some time ago.

William J. B. Stokes, prominent Trenton, N. J., rubber manufacturer, celebrated his 71st birthday anniversary on August 22 by entertaining the members of his family at dinner.

William H. Koons, New Jersey salesman for the Thermoid Rubber Co., Trenton, N. J., and Miss Edythe Devine, also of Trenton, were married recently in Trinity P. E. Church, Trenton. The couple spent their honeymoon in Quebec.

William C. Ehrenfeld, formerly president and general manager of the Dural Rubber Corp., Flemington, N. J., has purchased the **Doylestown Rubber Co.** plant at Doylestown, Pa., and is now engaged in getting the factory ready for occupation. The new company which Mr. Ehrenfeld heads will be known as the Rubber Products Co. The nature of the products to be manufactured will be announced later.

The Somerset Rubber Reclaiming Co., Millstone, N. J., reports very good business, and that the plant is now operating with a night shift. The company was established ten years ago by Irving Laurie of Highland Park, N. J., and now employs fifty men.

The New Jersey Rubber Co., New Brunswick, N. J., has filed a certificate decreasing its capital stock from $300,000, represented by 3,000 shares, to $50,000, represented by 500 shares. The company is controlled by the United States Rubber Co.

Joseph F. Lackey has leased the property at 78-80 Central Ave., Newark, N. J., for the sale and distribution of Michelin tires and tubes.

Rhode Island

The Woonsocket Rubber Co., Woonsocket, and the Revere Rubber Co., Providence, R. I., both subsidiaries of the United States Rubber Co., have reduced their combined capital stock from $6,000,000 to $1,500,000, a cut of $4,500,000. In each case, it is stated, the corporation proposed to purchase the outstanding stock from its assets for retirement. Action of the Revere Rubber Co. was taken at a special meeting held in Providence, Sept. 6. It was voted to reduce the preferred stock from $2,500,000 and the common stock from $2,000,000 to $500,000. In effect this concern is to retire $3,500,000 of its stock from its treasury funds. The Woonsocket Rubber Co. held a special meeting at Woonsocket on the same date and voted to reduce its capital from $1,500,000 to $500,000. Neither concern has amended its charter to reduce its authorized capitalization in accordance with the stockholders' vote but has simply filed copies of the votes taken.

Davis-Jones Insulated Wire Co. is operating its plant at Phillipsdale twenty-four hours a day on a three-shift schedule because of an unusually heavy run of orders.

Standard Tire & Rubber Co., 75 Fountain St., Providence, R. I., was wrecked by a fire last month when a large container of gum solvent exploded in the plant, spreading destruction through the large store and destroying a large stock of tires. The explosion was apparently caused by sparks from an electrically operated retreading machine which ignited escaping fumes from the container of inflammable solvent.

National India Rubber Co.'s fire department will hold its second annual banquet in the conference room at the factory plant in Bristol, R. I., on Oct. 8. Officials of the corporation and several out-of-town fire department heads have been invited as guests.

John J. Lavender, foreman of the outsole cutting department of the National India Rubber Co. for the past five years, has resigned. William J. Brahmsted, assistant foreman of the making department, succeeded Mr. Lavender, effective Sept. 15.

United States Rubber Co., of New Jersey, with an assessed valuation of $2,198,800, is one of 197 persons or concerns that are taxed on a total valuation of $10,000 or more in Bristol, according to the annual statement of the Board of Assessors filed the past month. It is the largest single taxpayer in the town, its tax charge being $54,310.36.

Le Baron C. Colt Memorial Ambulance

Maurice C. Smith, Jr., factory manager of the National India Rubber Co., Bristol, R. I., is president of the LeBaron C. Colt Memorial Ambulance, Inc., of that town, which has just completed its annual drive for popular subscriptions. This marks the eleventh anniversary of the purchase of the original ambulance by residents of Bristol in memory of the late LeBaron C. Colt, a nephew of the late Col. Samuel P. Colt, president of the United States Rubber Co. Since that time the ambulance has made more than 1,500 calls without charge to the people. To aid in the upkeep and maintenance of the ambulance the town annually appropriates $5,000. The National India Rubber Co. furnishes the housing, minor repairs, cleaning, drivers, tires and insurance, while the remainder of the expenses are borne by the Bristol people. In connection with the drive a tag day was held in the National India Rubber Co. plant by which more than $400 was raised.

New England

The Massachusetts Department of Labor & Industries has announced in the results of its monthly survey of employment and earnings in manufacturing establishments throughout the state that employment in the rubber footwear industry has increased 17.4 per cent and that the aggregate pay roll of this industry has increased 13.8 per cent.

The National Tire Dealers' Association at its convention, to be held in Boston Mass., November, 19-22, will have the following speakers: Roger Babson, nationally known analyst; Dr. S. A. Stratton, president M. I. T.; General Lincoln C. Andrews, director general of the Rubber Institute; and Frederick C. Hood, president of the Hood Rubber Products Co.

Raymond W. Kent and **Morris Omansky,** both well known in the rubber industry, have joined the technical staff of Arthur D. Little, Inc., chemists and engineers of Cambridge, Mass.

The Adhesive Products Co., Lynn, Mass., moved to its new quarters in that city. New equipment and new machinery will now enable the company to double its output.

The Fisk Rubber Co., Chicopee Falls, Mass., will make no downward revision of prices on its Premier line of tires which is competitive with the lines on which reductions have recently been announced by other companies. The management does not feel that a reduction in tire prices is warranted at this time.

Carbon Black Production

According to an estimate of Godfrey L. Cabot, Inc., 940 Old South Bldg., Boston, Mass., shipments of carbon black by manufacturers in the first six months of 1928, including all grades reported in the United States Bureau of Mines statistics, amounted to 133,000,000 pounds, or at the rate of 266,000,000 pounds annually. Production of all grades of carbon black was less than 118,000,000 pounds, marking a decline in stock of over 15,000,000 pounds for the six months.

The Cabot company has already increased its rate of production by 28,000,000 pounds annually, since the first of the year, and an addition to its plant at Pampa, it now has under construction, will increase its total capacity this year by over 34,000,000 pounds.

The Boston Woven Hose & Rubber Co., Boston, Mass., has appointed W. A. Briggs sales manager. R. J Owen has been made merchandise manager and H. F. Maxon becomes district field manager in charge of the territory which includes New York, Pennsylvania, New Jersey, Delaware and Maryland.

Frank H. Hale, president and general manager of Hale Shoe Co., Manila, P. I., is interested in canvas footwear materials. His address during October will be in care of United Shoe Machinery Corp., Albany Bldg., Boston, Mass.

The United States Rubber Co. was among the contributers to Byrd's exploration trip to the South Pole. The company's contribution consisted of special rubber boots and keds which were highly appreciated by Byrd and his men.

George B. Hendrick of Brockton, Mass., was appointed managing director of the newly organized Footwear Guild, Inc. He has been very active in large organizations. Among the positions he has held is assistant sales manager of the Fisk Rubber Co.

The Bay State Insulated Wire & Cable Co.'s plant, located at Hyde Park, a suburb of Boston, has been recently put on the market for sale.

The Murray Rubber Co., manufacturer of tire, tubes and mechanical rubber goods, has opened a branch office at 96 Brookline Ave., Boston, Mass. New England sales have increased so rapidly that it was necessary to open a branch office and warehouse where a complete stock of Murray and Empire rubber goods will be carried. J. M. Hower, who has served the company for the past 15 years, has been appointed New England district manager of the Tire Division. K. W. Reece is New England manager of the mechanical division and is assisted by M. J. Dickinson. Mr. Reece is well known to the rubber trade, having represented the Murray Rubber Co. on tires in Greater Boston. Mr. Dickinson has had extensive experience on mechanicals, having been formerly with the New York Belting & Packing Co.

Eastern and Southern

Joseph A. McNulty, 114 Liberty St., New York, N. Y., importer of red oxide, attended the first meeting of the One Hundred Year Club of New York Business Organizations. Mr. McNulty is eligible as a member of century old establishments having succeeded G. A. & E. Meyer who were established in 1805.

L. D. Tompkins, president of the General Rubber Co., has been appointed special representative of the president of the United States Rubber Co. as a member of the Rubber Institute. The General Rubber Co. is a subsidiary of the U. S. company.

Bernard Lester, assistant industrial sales manager of the Westinghouse Electric & Mfg. Co., has been placed in charge of the company's business relations with architects, builders, con-

Bernard Lester

tractors and manufacturers of machinery and appliances. His headquarters are at 150 Broadway, New York, N. Y.

The Swerling Trading Corp., 44 Whitehall St., New York, N. Y., was recently incorporated to import and deal in crude rubber. Samuel Swerling, Jr., is president; Nathan I. Sachs, vice president; and Hugo Hauff, treasurer.

J. B. J. Gibbs, 170 Fifth Ave., New York, N. Y., manufacturers' agent, sailed from Vancouver on Sept. 27 for Yokohama. Mr. Gibbs plans to investigate the rubber trade in Japan in general, and is eminently fitted for this work as he was a resident of that country for forty-five years, speaking the language fluently.

The Goodyear Rubber Ball & Novelty Co., Malone, N. Y., has provided its employes with life, health and non-occupational accident insurance through contract with the Metropolitan Life Insurance Co.

E. Howard Johnson announces that the business conducted by him for the past two years at Putnam, Conn., has been incorporated and will be continued under the firm name of Corone Wire Insulators, Inc.

M. L. Donovan is the new sales manager of the Cambridge Rubber Sales Corp., 125 Duane St., New York, N. Y. He has been in the shoe field for many years having been connected with the Federal Export Co., E. T. Wright & Co. and the United Shoe Machinery Corp.

The National Safety Council will open its seventeenth congress in New York on Oct 1. The Rubber Section will hold sessions on Oct. 1, 2 and 3 in the Hotel McAlpin.

New Fabric for Sport Shoes

The trend toward colors and fancy fabrics for tennis and sport shoes has filled the market with a large assortment of shades and novelty designs. The LadLassie Mill, Anderson, S. C., of which Turner, Halsey Co., 74 Leonard St., New York, N. Y., is the distributer, manufactures a close woven fast dyed yarn rubberized fabric which is made in ninety different color combinations. It is of such a strong and close weave that when combined with drill, sheeting or light duck is especially suitable for tennis shoes, galoshes, hospital sheets, bathing bags and other articles where fabrics of this character can be used. Its wearing quality and durability of color gives an almost unlimited field. Special color combinations are made on order.

Plain, high colored shades on different cotton fabrics, known under the trade name of SuNoFect, manufactured by the Gossett Mills, may also be utilized for many purposes. This fabric is guaranteed to be fast vat dyed and bright colorful shades of almost any hue may be obtained.

Science and Happiness

MEN of science, who have less difficulty than any others in finding an outlet for creativeness, are the happiest of intelligent men in the modern world, since their creative ability affords full satisfaction to mind and spirit as well as to the instinct of creation. In them a beginning is to be seen of the new way of life which is to be sought; in their happiness we may perhaps find a germ of a future happiness for all mankind.

—Bertrand Russell.

Denies Liquidation of National Crude Rubber Reserve

A report to the effect that the National Crude Rubber Reserve had been dissolved was denied by Charles B. Seger, president of the United States Rubber Co. Mr. Seger is quoted as saying: "There is no truth in published reports that the pool has been liquidated. It is a fact that shrinkage in value of rubber held by the pool has been written down and apportioned among its various participants, but its activities will continue."

New Factory for The Holstein Rubber Co.

The new factory of The Holstein Rubber Co., Inc., Hartford, Conn., just completed at Danbury, is of modern, fireproof construction, of the daylight type. New

J. S. Holstein

machinery of the most improved design has been installed and orders on hand will keep the factory running day and night until after the first of the year. The plant superintendent is Perley Hammond, a member of the American Institute of Rubber Technologists, who has had many years experience in this line. The production overseer will be Samuel Rosenblatt, whose connection with the rubber industry dates from 1902.

The Holstein Rubber Co. has been in the flooring business for over thirty-five years, and its founder and treasurer, Joseph S. Holstein, is a recognized leader in this field.

The production of the organization consists mainly of rubber tile flooring in plain and marbleized colors. It exactly reproduces the world's finest marbles and is ideal for every flooring requirement. In addition to the Holstein non-destructible brand of marbleized tile, the company will produce a Danbury brand tile to be marketed throughout the United States through distributers, many of whom have already been appointed. It will also be available in Canada through The Holstein Rubber Co., Ltd., of Montreal, a subsidiary. The factory will also produce rubber specialties and sponge rubber products.

Engineering

ENGINEERING is a profession and as such stands beside law and medicine. It is not a trade, though it is in contact with the trades. It is not a business, even though it has become a necessity to modern big businesses. Nor is it a science, though based on the exact sciences of physics, chemistry, and mathematics, and in its practice the engineering method is essentially scientific. It is concerned with utility, with the creation of services and things for public use, especially new kinds, better, more useful, or more economical than were available before. A most absorbing, clean, satisfying and unselfish game, the game of making nature work for man as man works for himself and his fellowmen, the finest and greatest game in the world.
—Prof. Charles E. Lucke in *Mechanical Engineering.*

The Radio World's Fair was formally opened Sept. 17 by Thomas A. Edison who was introduced by Henry Ford. Harvey Firestone also faced the microphone to pay tribute to the greatness of Edison.

Fire Prevention Week, October 7 to 13, to impress upon every one the need for care in the prevention of fire, and to stress each citizen's responsibility for the ravages of fire.

ARROW ON ROOF OF TEXTILE BUILDING, GOODYEAR TIRE & RUBBER CO., LOS ANGELES, CALIF., DIRECTED TRANS-CONTINENTAL FLIERS TO GOAL

Pacific Coast

American Rubber Mfg. Co., Oakland, Calif., through President N. S. Dodge, announces the appointment of William R. Goudie as general sales manager with headquarters at the principal office, Park Ave. and Watt St., Oakland. Mr. Goudie has had twenty-six years' experience in rubber manufacturing and selling in this country and abroad, and has spent the past fourteen years in the West. Latterly he had been southern sales manager for the American company, with offices in Los Angeles. The company's products include rubber belting for transmission, conveying, and elevating, as well as heavy hose, packing and general mechanical rubber goods.

Hood Rubber Products Co., marketing the products of the Hood factories at Watertown, Mass., has within the past few months declined orders for thirty-five carloads of hard rubber battery boxes for delivery in the far west territory owing to the fact that the eastern works capacity has been overtaxed and the orders have been received too late for execution this season. Business has been going strong in battery jars as well as boxes, and in tires, tubes, and rubber footwear. The latest item, heels, is also said to have met with much success. As reported by Pacific Coast District Manager J. J. O'Connor, with headquarters at 450 Ninth St., San Francisco, Calif., the only recent change in the Pacific Coast personnel has been that of R. A. Davis, who has replaced O. C. Hanson as Seattle branch manager.

New York Belting & Packing Co. has not remarked any let-up in business on account of the pending election in so far as Pacific Coast trade is concerned, and according to Pacific Coast Manager A. H. Gregory, with headquarters at 519 Mission St., San Francisco, Calif. Sales and prospects indicate that 1928 will show a marked advance over the 1927 total.

India Tire & Rubber Co., as reported by Pacific Coast Manager W. R. Wheatly, with headquarters at 460 Ninth St., San Francisco, Calif., is far exceeding all its previous records for volume of business from Seattle to San Diego, its main anxiety now being keeping deliveries up to sales. Mr. Wheatly recently replaced Frank L. Ryan, who had been called to the factory in Akron to direct the sales force.

Stauffer Chemical Co., which supplies sulphur and other compounding ingredients to the rubber trade, and has many mines and factories in this country and abroad, is building a $750,000 caustic soda and sulphuric acid plant on a 10-acre plot at Dominguez Junction, south of Los Angeles, as stated by John Stauffer, Jr., manager of the company's Southern California plants.

Oliver Tire & Rubber Co., 4343 San Pablo St., Oakland, Calif., one of the large manufacturers of semi-cured stock, cement patches, and general repair materials, reports a satisfactory increase in sales despite the present low price range on new tires.

United States Rubber Co., Pacific Goodrich Rubber Co., and **Firestone Tire & Rubber Co.**, of California, had airplane tire exhibits and maintained service stations at the National Air Races and Aeronautical Exhibition at Mines Field, near Los Angeles, during the early part of September.

Inland Rubber Co., Chicago, Ill., has established two more factory branch stores on the Pacific Coast, at Santa Monica and San Bernardino, Calif.

Samson Tire & Rubber Corp. of Los Angeles has been adding much mechanical equipment of late to its main plant at Compton, which is still working 24 hours a day in trying to meet rapidly-increasing demand for tires and tubes, the company now ranking among the large production concerns of the country. It is stated that output at the No. 2 plant in San Diego is also growing fast and may before long reach the capacity of that large factory. President A. Schleicher has lately been making a business trip through the middle and eastern states and Sales Manager W. W. Drum has been speeding up distribution personally in the southern states.

McClaren Rubber Co., Charlotte, N. C., according to H. E. Williams, Pacific Coast manager, with headquarters at San Francisco, Calif., notes an excellent increase in business in the far west territory during the past few months. Lee Woodruff, general sales manager of the factory, and who was Mr. Williams' predecessor, has been visiting the Coast after an absence of three years.

West American Rubber Co., 400 N Ave. 19, Los Angeles, Calif., is enjoying an unusually large business in oil field supplies for domestic and foreign fields and in various mechanical rubber specialties, as stated by President Douglas Radford. Vice President Charles Lamb left recently on a business and pleasure trip to England.

W. J. Voit Rubber Co., according to President W. J. Voit, is fairly swamped

with orders for its patented rubber playballs at its new factory, 1604 E. 26 St., Los Angeles, Calif., and is working night and day. Recently it has succeeded in improving its products and markedly lessening their cost. Plans are being considered for a large building extension in the spring and the addition of much equipment. At its original plant, 970 S. Alameda St., it is producing a considerable quantity of camelback and other tire repair material.

Kirkhill Rubber Co., 5811 S. Hoover St., Los Angeles, Calif., according to Treasurer and General Manager T. Kirk Hill, is still working on a 24-hour-a-day schedule begun two years ago. It manufactures 700 different rubber specialties, largely patented articles for various trades, comparatively few being standard mechanical rubber goods. It has just completed a new building, adding 2,400 square fet of floor space, and has installed a new mill and two more two-platen hydraulic presses.

Pacific Goodrich Rubber Co., Los Angeles, Calif., reports that its big new plant is now quite complete, all departments functioning perfectly. Production averages 3,500 tires and 3,000 tubes daily, and these figures will be soon increased considerably, it is stated. Plans are being considered for a new service and warehouse station centrally located in Los Angeles to supplant the distributing station long maintained at 1392 E. 7 St., in charge of F. L. Hockensmith; as well as for a new Goodrich building in San Francisco. Tire sales in the coast territory are reported as well above the quota set for the year, with substantial advances in sales of the thousands of Goodrich rubber standard goods and specialties.

Goodyear Tire & Rubber Co. of California reports its Los Angeles plant producing an average of 12,500 tires and a somewhat smaller number of tubes daily, with every department taxed to utmost capacity, and continual overtime throughout the works. This contrasts with an average of over 60,000 tires a day at the parent factory in Akron. Vice President Clifton C. Slusser and factory manager of the Akron works returned to the latter plant on September 15 after spending a week at the Los Angeles factory, which he had opened in 1919 and of which he had been first superintendent, and later general manager, being recalled to Akron in 1922. He had been in conference at the Los Angeles plant with General Superintendent E. J. Thomas in connection with an expansion program, a feature of which includes the installation of a conveyer system in the tire making department and which is said to be one of the most efficient devices of the kind in the country. President Paul W. Litchfield is expected to visit the Los Angeles plant in November.

Firestone Tire & Rubber Co. of California is making fine headway at its recently opened plant in Los Angeles, according to Chief Engineer Nelson H. Myers. All the heavy machinery and practically all the lighter equipment are now in place and ahead of schedule, some 2,000 tires are being turned out daily. After some delay in getting material and equipment, work has been actively resumed on the big reclaiming plant adjoining the main mills, and the improvement of the grounds and paving on the adjoining highways are rapidly progressing, so that it will soon be possible to set a date for the formal public reception which it was announced would be held at the new works. The Firestone company is building a two-story class A service building and warehouse at the southeast corner of Towne and 8th Sts., a central Los Angeles location. Vice President Russell A. Firestone, son of Harvey S. Firestone, head of the parent company in Akron, and who will be in charge of the California concern, is arranging to make his home in Southern California at a point convenient to the new works.

Rubber Corp. of America, 17th and Kansas Sts., San Francisco, Calif., it is stated by Vice President and General Manager W. Flanders Setchel, has practically completed its experimental work in the development of the Keaton nonskid tire in connection with the Freeman Peterson patented triplex construction with special regard for the tire's adaptation to heavy truck service; and that results so far have been very satisfactory. The company has bought the Keaton plant at the address given and has reconditioned it throughout. Installation of machinery will be completed by the first week in October, and in what the company contends will be one of the best equipped plants on the Pacific Coast, the manufacture will be begun at once of not only tires but also of a wide range of mechanical goods. The officers are: President, A. L. Clark; vice president and general manager, Mr. Setchel; secretary, Harry R. Buttimer, C. P. A.; treasurer, Charles P. Hoehn; rubber technologist, Edgar C. Huyck.

Mark L. Felber has been made managing editor of the Santa Anna, Calif., *Times*. A former Akron resident, Mr. Felber was for several years editor of the *Akron Press* and later director of Firestone Tire & Rubber Co.'s news service.

Midwest

Paul Van Cleef, of Van Cleef Bros., Woodlawn Ave. and 77th St., Chicago, Ill., is traveling through China, Japan and various points in the Far East, to be absent until the latter part of December. Mr. Van Cleef is combining both business and pleasure, and will visit quite a number of business connections and make a general survey of the rubber situation. During his absence, Noah Van Cleef will be in charge of operations.

The North Central Terminals Co., 1030 W. North Ave., Chicago, Ill., has opened its new 200,000 square foot building in which complete warehousing service is offered. S. Birkenstein & Sons, Inc., of Chicago, is interested in this enterprise.

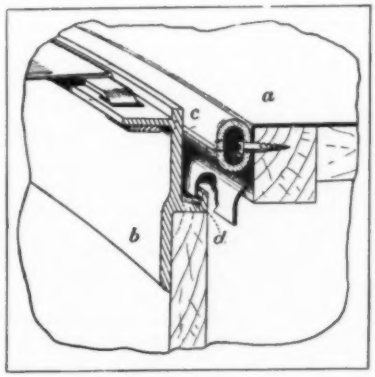
The Ramsey Accessories Mfg. Co. is installing machinery in its new $160,000 home at Forest Park Blvd, and Spring Ave., St. Louis, Mo. The present plants at St. Louis and at Holland, Mich., will be combined in the new building.

The Fisk Rubber Co. has completed a new $100,000 building in Omaha, Neb., at 10th and Dodge Sts. The structure is of brick and stone, 120 by 132 feet.

The Haywood Tire Equipment Co., manufacturer of a complete line of tire repair and vulcanizing equipment, is located in new and larger quarters at 2329-2361 Ogden Ave., Chicago, Ill. The company was recently purchased by John A. Schreiber and associates and the officers under the new régime comprise Mr. Schreiber, president; Ernest Reckitt, vice president; A. F. Schneider, secretary; and R. G. McKnight, sales manager.

Tire Companies Show Inventory Losses

While tire companies have sold far more tires than ever before, reports for the first six months fail to show, with few exceptions, a net profit. Rubber inventories purchased around forty cents a pound have had to be evaluated at about twenty cents a pound, with tire prices correspondingly lower.



Rubber in Cowl Joint

The increasing use of rubber in automobile body construction is evident. A popular form of cowl joint here pictured employs a flattened rubber tube and a drip channel located between the cowl and the dash. This allows relative movement of the cowl, a, built on the body, and the dash, b, supported on the chassis. The joint is sealed by a flattened rubber tube, c, below which is a drip-channel, d, to catch rain water and lead it out to the sides.—S. A. E. Bulletin.

Canada

It is said that the benefit of tire simplification will not be felt in Canada for some time as there are many thousands of cars in present use which are considered obsolete; nevertheless, they will require tires for years to come. Although high pressure tires have not been standard equipment since 1924, the Canadian market this year will absorb approximately 50 per cent of the total consumption in high pressure and 50 per cent in balloon tires.

No change in rubber footwear prices is expected before the end of the year. Deliveries of fall and winter stock are now being made to the retail trade. Travelers are showing samples of tennis footwear for next season and have started booking orders. Business in tennis shoes has been assisted by fine weather. It is quite a long time since their line has been so well sold up. Dealers report a big summer's trade in tires. Prices are so low these days that owners buy new tires much more frequently than a few years ago.

Goodyear Tire & Rubber Co. of Canada, Ltd. C. H. Carlisle, president and general manager, states that the mechanical goods output is sold out. Production of tires is up to about 9,200 daily, while tube production is higher. This production is approximately 26 per cent ahead of last year. Construction has been started on a four-story building 300 by 100 feet, which put into operation will bring the company's output at New Toronto, Ont., to 10,000 and 12,000 tires daily.

The Prest-O-Lite Storage Battery Co., Ltd., Toronto, Ont., will build a factory branch at Regina, Saskatchewan, having an agreement with General Motors of Canada, Ltd., to supply batteries for cars produced in the new assembly plant. These requirements, together with Prest-O-Lite Co.'s other business in Regina, will require 50,000 to 60,000 batteries per annum.

Canada Golf Ball Co., Ltd., 241 Dovercourt Rd., Toronto, Ont., is marketing canary yellow, and oriole orange golf balls, and expects them to be popular with golfers.

Columbus Rubber Co. of Montreal, Ltd. The Athletic & Social Association of this company recently held a day's outing at Lavaltrie, Que., in which over 200 took part in the excursion down the St. Lawrence River. A series of sporting events took place at the picnic grounds, all of which were keenly contested. The committee consisted of W. J. Danis, president of the Association and chairman of the picnic committee, Gordon H. Nickel, sales manager of the company, A. Couture, and A. Tourgeon.

Goodyear Tire & Rubber Co. The baby blimp Puritan of Akron, O., recently visited Toronto, Ont., carrying a pilot, two mechanics and an official of the Goodyear company.

James Willard Jordan, B. A., vice president and general manager of the Canadian Goodrich Co., Ltd., Kitchener, Ont., was the subject of an illustrated sketch in the Montreal *Daily Herald* entitled "Captains of Industry."

John Myles, of the Columbus Rubber Co. of Montreal, Ltd., accompanied by Mrs. Myles, recently paid a visit to his home in Scotland, and also visited in England and France.

W. Milholm, special representative of Leyland & Birmingham Rubber Co., Ltd., Leyland, Eng., is visiting the Canadian trade.

The Jem Rubber Co., Ltd., 3728 Dundas St. W., Toronto, Ont., maker of balls and other rubber toys, was recently damaged by fire.

W. H. Miner, president and general manager of Miner Rubber Co., Ltd., Granby, Que., and Mrs. Miner, recently entertained at their summer residence on Lake Bonnallie, the factory superintendents, foremen and office staff with their families. Approximately 200 persons were in attendance and enjoyed the athletic games. The prizes were presented by Mrs. Miner.

Rubber Association of Canada. At a recent meeting of this body it was decided that the placing season on new footwear lines for spring and summer, 1929, should be opened on September 1.

The Seiberling Rubber Co. of Canada, Ltd. (Toronto branch) has removed from 389 Yonge St. to 172 John St., Toronto, Ont. Alterations to the premises have been made to conform to the company's requirements and they are now equipped to render expedient service to the increasing list of dealers. Enlarged volume of business in the Province of Ontario with the consequent need of larger sales and warehouse space has made the change in location necessary.

J. H. Porter, recently branch manager of the Ames Holden McCready Rubber Co., Ltd., Saskatoon, Sas., is now marketing the product of the Woodstock Rubber Co., Ltd., Woodstock, Ont., in Northern Saskatchewan. A stock warehouse has been opened in Saskatoon.

A. E. Morrissette, of the Dominion Rubber Co., Ltd., has been elected vice president of the Quebec Division of the Shoe and Leather Travelers' Association.

Panther Rubber Co., Ltd., Sherbrooke, Que., maker of Panco soles, claims that over 100 Canadian shoe manufacturers are using Panco soles in various styles and sizes.

General Tire Corp. of Canada, Ltd., has taken over the plant formerly occupied by the Oak Tire & Rubber Co., at Oakville, Ont., and is preparing to produce casings, meanwhile tubes are being made. The new company plans to make tiling and heels. James G. Merrick is secretary-treasurer.

A. D. Thornton, a director of the Dominion Rubber Co., Ltd., Montreal, and a prominent Rotarian, recently addressed the Rotary Club at luncheon on the history of rubber production, in which he stated that the British rubber restriction avoided a great calamity not only to the industry itself, but to other enterprises which are dependent upon it.

The Federal Rubber Products Co. has located in Stratford, Ont., in the factory formerly occupied by Vickers, Ltd. (England). This company bought out Federal Products Mfg. Co., Ltd., of Wingham, Ont., and the equipment has been moved to the Stratford plant.

The Canadian Fabrikoid, Ltd., New Toronto, Ont., is a manufacturer and distributer of pyroxylin coated and rubberized fabrics.

Electric Distributing Station

On September 17, 1928, an electric distributing station was put in operation at 238 St. and Spuyten Duyvil Rd., New York City, by the New York Edison Co., which is operated without a human being inside its walls. It will ultimately be able to supply power sufficient to light the homes of approximately 300,000 families. This station will be controlled from another station more than three miles away. The various transformers and circuits in the new station may be placed in service by simply pressing keys which send over wires electric impulses of the dot and dash system used in telegraphy. Automatic signals from the station will inform the operator whether the equipment is functioning properly. "Televox" was described in INDIA RUBBER WORLD, April 1, 1928.

Footwear Imports

During July, 1928, 3,200 pairs of rubber boots and shoes valued $2,228 were imported into Canada, a decrease from July, 1927, when 13,397 pairs were imported valued $19,143.

Kro Flite Golf Ball

In a recent game played by Anthony Stebor of the C. Kenyon Co., Brooklyn, N. Y., with a Kro Flite golf ball he went over the course, in a morning and afternoon session, with a total of 132 shots for the 36 holes and used only two balls. The Kro Flite ball is a Spalding product which, it is claimed, will greatly improve one's game.

Enclosed Switches Eliminate Accidents

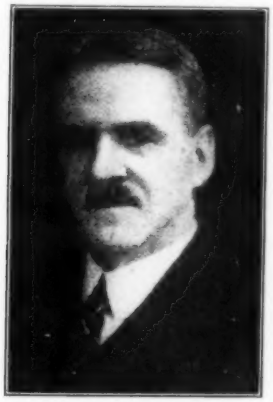
An unusual accident, reported from one large plant, might have been avoided had an enclosed switch been substituted for the jackknife variety. A two-twenty switch of the jacknife type was attached to the wall about five feet from the floor, and the workmen were accustomed to open the switch sufficiently to start an arc from which to light pipes, cigarettes or cigars. One man, on a rainy day, attempted to light a wet cigar, and the current passed through his mouth, disfiguring him for life.

Obituary

Managing Director of English Goodyear Plant

Officials of the Goodyear Tire & Rubber Co. were greatly saddened by the news of the passing away on Sept. 17, of Charles P. Skinner, managing director of the Wolverhampton plant. Mr. Skinner's death occurred just about three weeks after that of Thomas A. Linnane, superintendent of the same plant.

Mr. Skinner first became associated with the Goodyear concern in 1922 when he joined the company as managing director of the plant in Johannesburg, South Africa. Prior to his affiliation with Goodyear, he was in the employ of the Racine



Charles P. Skinner

Horse Shoe Tire Co. In 1924 he took the post he held at the time of his death.

A native of Boston, he was a graduate of the Iowa University and was 52 years of age.

Funeral services were held in Wolverhampton on Sept. 20, with William Stephens, general superintendent of the Akron plant, representing the home office at the obsequies.

Mr. Skinner is survived by his widow and two children.

Internationally Known Traveling Salesman

The death is announced on August 18, 1928, of Rudolf Bardewyck. The deceased had for the past 25 years been selling the compounding ingredients put on the market by Lehmann & Voss, Hamburg, and in this capacity he had traveled widely. He was a well-known figure in rubber and cable factories throughout Europe, as well as in the United States and Canada. Latterly he had been making use of the airplane in his travels, flying to Finland, Sweden, and other countries.

Rudolph Bardewyck's kindly and helpful nature made him popular wherever he went and a wide circle of friends and business acquaintances both here and abroad will regret his passing.

Walter C. Arthurs

While returning with his family from a vacation spent in Minnesota, Walter C. Arthurs, president of the Mount Vernon Car Mfg. Co., Mount Vernon, Ill., died suddenly. Mr. Arthurs was sixty-three years of age, a native of Hillsboro, Ill. He had large real estate holdings and was a director of the First National Bank of St Louis and the Third National Bank of Mount Vernon. Mrs. Arthurs and two children survive.

Superintendent of N. I. R. Co.

William H. Gardiner, 56 years of age, died suddenly Sept. 6, following a heart attack previous to which he had been in apparently excellent health. The day before he was at his desk at the National India Rubber Co., Bristol, R. I., where he was employed as superintendent. Mr. Gardiner was born at Newport, R. I., but for a number of years made his home at Bristol, removing from there to East Providence some two years ago, to live with a daughter. He leaves one son, William C. Gardiner of Newark, N. J., two daughters and eight grandchildren.

Theodore K. Felch

Theodore K. Felch, treasurer and assistant secretary of the Eureka Fire Hose Co., died August 29 as the result of a heart attack. Mr. Felch, who was 57 years of age, was connected with the Eureka company since 1908. He is survived by his wife.

Dean of the Textile Industry

William Whitman, widely known textile manufacturer, died at his home in Brookline, Mass., Sept. 20, in his eighty-seventh year. He was chairman of the board of directors of William Whitman & Co. of Boston.

Mr. Whitman, who was born on a farm at Round Hill, Nova Scotia, on May 9, 1842, began his career as an office boy in a dry goods store at St. John, N. B., but went to Boston at the age of fourteen. In a few years he became a leader in the textile industry of New England and was treasurer and later president of the Arlington Woolen Mills at Lawrence. Extending his interests to other cities, Mr. Whitman became president of the Whitman Mills, Manomet Mills, Nonquitt Spinning Co., Nashawena Mills and Belleville Warehouse Co., all of New Bedford; the Hoosac Worsted Mills of North Adams, the Acadia Mills and Monomac Spring Co. of Lawrence; the Textile Specialty Co. of Boston and William Whitman Co., Inc., Boston dry goods commission merchants.

Popular Executive Passes Away

Following an operation for appendicitis, Thomas A. Linnane passed away at Wolverhampton, England, Friday, August 24. He had been general superintendent of the English Goodyear factory since September, 1927.

A native of Akron, O., and a product of its public schools, Mr. Linnane passed most of his business life in his natal town. Previous to his connection with Goodyear, he had been with Whitman & Barnes Co., twist drill manufacturer, and the Diamond Rubber Co. He entered the employ of the Goodyear Tire & Rubber Co. in 1911 as supervisor and was promoted to foreman, general foreman and eventually was made division superintendent.

While in the Akron factory, Linnane directed the establishment of the by-prod-

Thomas A. Linnane

ucts division and factory specification system and was in charge of all production in the Goodyear factory during the war. When it was decided to establish an English factory, he was selected to inspect sites and chose the old Wolverhampton factory. His selection was approved, and upon the completion of the reconstruction work on the plant, he was named general superintendent and sent to England to head the activities of the large group of Akron workers who had accepted positions in the new factory.

The body was returned to Akron for burial and funeral services were held there on September 11 at St. Mary's Church with interment at the Holy Cross Cemetery. The chimes on the Goodyear factory played at the funeral hour and production was halted in the plant for three minutes.

Mr. Linnane is survived by his wife and five children.

Death of Mike Flynn

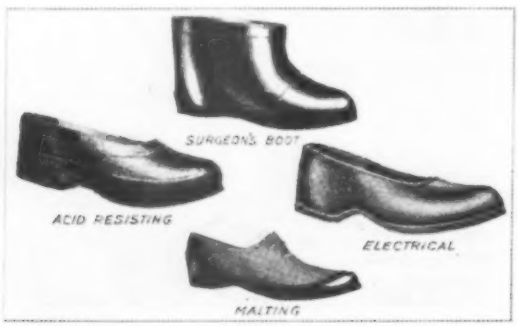
Michael A. Flynn, the well-known rubber superintendent and designer of special tire building apparatus, died suddenly of heart failure on September 26 at his home in Akron, O. His obituary and portrait will be published in our next issue.

English Rubber Footwear

LIFTING up its voice against the layman's habit of looking upon rubber footwear as necessary and protective, but dull and unattractive, the Rubber Growers' Association, Inc., has prepared some interesting and informative data on this subject.

It is remarkable to view the improvement made in rubber footwear from its crude beginnings among the South American Indians to the present day with its variety of attractive styles to meet every conceivable purpose. There was no real attempt to make rubber shoes until eighty or ninety years ago, and then the only thought was to provide protection against wet and damp, while the resiliency of rubber footwear was not considered important.

The modern rubber boot or shoe is an intricate piece of work and calls for the attention of qualified chemists, engineers, engravers, calender hands, last makers, trimmers, packers, and other skilled workers before it reaches the hands of the wearer. Years ago all that was necessary was



Footwear for Industrial Purposes

to make a rubber covering which would fit an ordinary shoe; now experts are kept busy designing new fashions, following to a certain extent those of leather footwear, which must be trim, neat, perfect fitting and, above all, stylish in appearance.

A use for rubber footwear, not so generally known, is for industrial purposes, and it is to be found wherever infection or danger to life and health must be prevented. Rubber is not only absolutely waterproof, but is a non-conductor of electricity. It can easily be washed and sterilized making it practically germ proof and so invaluable to surgeons in operating rooms. As it can be treated to withstand the deleterious effects of chemicals and acids, workers, in industries where acids are employed, by its use can save their flesh and footwear from being injured by corrosives. In explosive and match factories, rubber footwear prevents any friction being set up which is likely to cause a spark.

Electrical footwear consists of boots and shoes made of all-rubber with seams reinforced by a strong fabric. In the case of dangerous work, electrical footwear can be tested at the manufacturers' electrical station, to a pressure of 20,000 volts for a period of five minutes, without breakdown.

Acid resisting footwear includes boots and shoes of all-rubber, specially prepared to withstand certain percentages of acids.

Miners' boots are very strong laced boots with extra thick soles, provided with gusset tongues to prevent any wet from penetrating through the lace holes. They are in general use in mines throughout the world.

Shoes for breweries, laundries, etc., are made of brown waterproof canvas with extra heavy sole, easy to clean. This type of footwear conserves the operatives' health as the constant walking in the damp and wet conditions of the factories undermines resistance and makes the worker an easy prey to disease.

Rubber footwear is more largely used in the United States than in any other country in the world. While total production figures are difficult to obtain, an idea of the extent of its present use can be seen from the total export figures of all countries for 1924 which amounted to about twenty million pairs.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

NUMBER	INQUIRY
1149	Manufacturer of tire splitting machine.
1150	Machine to make abrasion tests on rubber heels.
1151	Manufacturer of imitation linen tablecloth made of rubber.
1152	Makers of soft rubber rollers.
1153	Information as to method of removing overflow from small rubber articles.
1154	Manufacturer of Sanitas red perforated mats.
1155	Machine for cutting rubber bands from old inner tubes.
1156	Manufacturer of tablets with nitrate base for inflating balls during vulcanization.
1157	Volumetric cutting machine for heels.
1158	Manufacturers of windshield wiper blades.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

NUMBER	COMMODITY	CITY AND COUNTRY	PURCHASE OR AGENCY
33,011	Bathing caps and shoes, tennis shoes, druggists' sundries and specialties	Vienna, Austria	Agency
33,022	Bathing caps and shoes	Vienna, Austria	Agency
33,068	Tires	Vienna, Austria	Both
33,098	Tires	Aguadilla, P. R.	Agency
33,100	Balls	Rosario, Argentina	Both
33,101	Tires and tubes	Jaffa, Palestine	Agency
33,102	Sport shoes and overshoes	Berlin, Germany	Agency
33,103	Overshoes	Berlin, Germany	Agency
33,107	Vulcanized overshoes	Berlin, Germany	Agency
33,108	Heels	Berlin, Germany	Agency
33,142	Shoe soles	Caracas, Venezuela	Agency
33,153	Toy balloons	Valparaiso, Chile	Agency
33,194	Tires	Ghazi-Aintab, Turkey	Both
33,195	Tires	Manta, Ecuador	Agency
33,277	Belts and sponges	Vienna, Austria	Either
33,278	Overshoes	Stettin, Germany	Either
33,279	Medical and hospital goods	Budapest, Hungary	Agency
33,280	Balloons and fountain pen sacs	Lahore, India	Agency
33,281	Druggists' sundries	London, England	Agency
33,288	Machinery belting	London, England	Agency
33,322	Canvas shoes	Alexandria, Egypt	Agency
33,327	Overshoes and heels	Berlin, Germany	Agency
33,340	Tires	Mersina, Turkey	Agency
33,358	Hip boots	Havre, France	Purchase
33,368	Raincoats and sport shoes	Rome, Italy	Purchase
33,379	Hose	Stuttgart, Germany	Purchase

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

NUMBER	SPECIAL CIRCULARS
2020	Druggists' Sundries Market in Australia.
2068	Exports of Casings from Manufacturing Countries.
2070	Rubber and Balata Belting Exports.
2073	Exports of Rubber Footwear from Manufacturing Countries.
2080	Tire Exports.

Golf has long since been a National sport, therefore, the brief history and complete list of patents relating to the manufacture of golf balls on page 63 will be of interest.

The Rubber Industry in Europe

Great Britain

London Stocks

The satisfactory reduction in London stocks of rubber has caused a feeling of greater confidence in Mincing Lane regarding the rubber situation.

Total stocks at the end of the first week of August were 34,294 tons against 66,285 tons, the peak figure for the year, which was reached at the end of January. The August figure is the lowest since September, 1926. Consumption statistics have also improved and American figures for July are estimated at 40,000 tons against arrivals of 30,000 tons.

In spite of the favorable statistical position the price of crude rubber fails to respond and this is attributed by Mincing Lane to the uncertainty that prevails regarding what will happen after restriction is removed. Growers and buyers are adopting a waiting policy. While the low price of rubber is admitted to be disheartening the general feeling seems to be that this is but a temporary phase. The average of the past quarter, 9.154 pence per pound, was the lowest since restriction was introduced. The highest average for a quarter was 3 shillings, 10.709 pence for the three months ended January, 1926, when the exportable allowance was 85 per cent. The average for the quarter ended July, 1927, was 1 shilling 6.165 pence.

Some Opinions

In a recent number of the *Rubber Quarterly*, it is calculated that on the existing basis of standard production of 336,990 tons, an average estate output of 80 per cent between the end of June and the end of October would add 22,466 tons to the present total stock of Malaya, bringing the total to 80,800 tons, in round figures. An average of 85 per cent would give 86,410 tons, while one of 90 per cent would make it 92,930 tons. The question now is how far can the rubber trade cope with this additional amount of rubber?

To answer this question it is only necessary to consider the marked fall in the world's visible stocks during the last few weeks. In three months London stocks have been reduced by 17,900 tons, and during the first half of this year world stocks have been cut by no less than 74,000 tons, and it is considered that if the process of diminution continues during the next quarter at a similar rate, the end of October may find visible stocks reduced below the level which past experience has found desirable.

Stanley F. Ward & Co. estimates 1928 rubber production at 597,300 tons and consumption at 654,000 tons, showing a reduction of world stocks by 56,700 tons for the year. They assume that in 1929 consumption will show an increase of 19 per cent, that is 65,000 tons. A very small area is expected to come into bearing so that it is thought that the full and free British production during 1929 will yield not more than an extra 60,000 tons, so that a fair increase of supplies from other countries will be needed to prevent a continued decrease in the world's stocks. Should manufacturers use more plantation rubber instead of reclaim, the whole position may be very materially changed. This reduced consumption of reclaim has been regarded as certain and estimates vary from 5 to 30 per cent of the annual total of 200,000 tons. It is thought likely that large American manufacturers are only now getting the benefit of lower prices of crude rubber, which will induce them to use the plantation product more freely.

Symington & Sinclair quote the stock figure of rubber in Ceylon on June 30 as 9,300 tons against an estimated normal requirement of 7,000 to 8,000 tons, and point out that as the amount of unused coupons in Ceylon has actually increased up to June 1, excess rubber from Ceylon on November 1 may be negligible.

A well-known firm of rubber share brokers writes in a recent circular that there is every reason for confidence in the future of the industry, but that anything in the way of a premature revival might easily do harm, and it is hoped that shallow optimism will not bring in a crowd of speculators. The position, it is stated is improving month by month, and ninepenny rubber for some time to come ought to finish the good work and bring about a return to genuine prosperity when the change arrives.

Plating Rubber with Gold or Silver

The manufacture of articles plated with gold, silver or other metal is about to undergo a revolution, it seems, due to the use of rubber by the Warren process of chemically metallising a surface of vulcanite and other materials. The inventor of this process, A. G. Warren, of Derby, found that if metal foil, preferably one of gold-silver alloy, is pressed into contact with ebonite or other substance containing rubber with a minimum of 7½ per cent of sulphur and heated, a film of metallic sulphide is produced which gives very powerful adhesion, and, when the foil is stripped away, can be reduced by an ammoniacal solution so as to leave a thin metal film upon which copper or other metal can be deposited electrically to form a strongly adherent layer. Consequently any article made by this process has no seam, soldering, pins, or joint and is a one-piece article of great durability. All articles for the luxury trade can be made by this process, besides it also has wide possibilities in the field of electrical instruments and wireless apparatus.

The Warren patents are held by the British Metallising Co., Ltd., of Bridge House, 181, Queen Victoria St., London, E.C.4, and among their 1,800 shareholders are some of the principal firms of silversmiths. The company has outgrown its present accommodations and is building a new factory.

New Latex Use

An interesting new use for latex is described in *Nature* (1928, 121, 497), in which the material is used either as it is or else colored with a suitable dye or pigment, as an injection mass for blood vessels in the place of other media employed in making anatomical preparations. After the latex has been injected, it is coagulated by soaking the specimen in acetic acid. It seems that this method offers a number of advantages over those hitherto employed.

British Notes

Industrial Rubber Manufacturers, Ltd., announces that arrangements are proceeding satisfactorily by which the company will make the products of the Miller Rubber Co. of America at its factory under license. The company is arranging to acquire additional space adjoining the present factory with a view to rapid expansion. The American company will require only 500 tires a week and the board estimates that from this item alone the profit will be near £15,000 a year. The company will continue under its present management and control.

Henry Ford & Son has decided to transfer the bulk of its works from Cork, Ireland to England, and a large part of the newly erected machinery has already been brought over to Manchester. The decision is due to the difficulty of meeting the problem of the import duty which bids fair to shut the Ford car out from the British market. Most of the company's output at Cork was in the past absorbed by the English factory and since last April had to bear the British import duty of 22 2/9 per cent besides freight, insurance and packing.

Plans regarding the new Ford works to be constructed at Dagenham include blast furnaces, steel-rolling mills, and a large power station. Construction of the works proper is to start soon. The factory will cover 30 acres of the 300-acre site at Dagenham and is to be a copy on a smaller scale of the Detroit plant. A big wharf will be built out into the Thames, for Dagenham is on the Essex side of this river, and several miles of roads and railways are to be laid out.

The Djaboong (Java) Rubber Estates and a similar rubber estate in Java are to be amalgamated according to the company's annual report recently published

in the *Financial Times*. The company was formed 18 years ago and has an issued capital of £32,640 in shares of 5 shillings each. A dividend of 10 per cent will be declared for the business year ended March 31, 1928, against 25 per cent for the year before.

Holland

During the first half of 1928, Holland imported 57 tons of wild rubber and 1,761 tons of plantation rubber, against 292 tons of wild rubber and 2,502 tons of plantation rubber in 1927. On the face of it this would indicate that Holland had used considerably less rubber during the current year than last year, but whereas in the first half of 1927 practically all the rubber was reexported (129 tons wild rubber and 2,244 tons plantation), reexports in 1928 showed a marked decrease (123 tons wild, 866 tons plantation).

Imports of manufactured rubber were practically the same as in the preceding year with the exception of shoes, imports of which rose from 587,355 pairs to 815,358 pairs in the first half of 1928. Of the remaining items may be noted automobile tires, 89,052 instead of 89,666 (41,677 from America in 1928); tubes, 68,490 against 77,227 (32,410 from America); bicycle tires, 834,230 against 835,599; bicycle tubes, 773,842 against 607,604. Belgium supplied over 50 per cent of the bicycle tires and 44 per cent of the tubes.

Exports included besides the quantities of crude rubber already mentioned, 1,939 tons of waste against 972 tons; also 466,244 bicycle tires as compared with 478,777 and 241,478 tubes against 226,993. Great Britain was Holland's best customer for bicycle tires.

U. N. Rubber Factories

The N. V. Vereenigde Nederlandsche Rubberfabricken (United Netherlands Rubber Factories) reports more favorable results for 1927 than 1926, the balance showing a profit of 119,425 guilders against a loss of over 1,340,000 guilders the year before. Foreign competition kept profits down to the above low figure. However, sales continue to increase and the export business in rubber soled leather and canvas shoes has taken a distinct upward swing. In the course of the year the firm obtained patents for gas masks and rubber floor coverings, and other very important patents are still pending. The number of employes increased to 1,000 in 1927.

Dutch Growers Reject Organization Proposals

It is reported that at a meeting of Dutch rubber growers, convened to consider proposals for establishing an organization to prevent wild fluctuations in rubber prices and to maintain prices at a sufficiently high level to make rubber growing remunerative, it was decided not to take action for the present. Special measures were not desired in view of present conditions, it was held.

Germany

Census of German Automobile Tire Industry

The National Bureau of Statistics has published a census of tire production in Germany during 1927, and compared with 1926, the tire industry showed some improvement. The greatly increased automobile traffic stimulated production and sale of tires, but this was offset by the necessity of reducing prices on account of foreign competition and the low prices of rubber.

Of the 23 factories, which the census covers, those in Prussia (chiefly in Hannover and Hessen-Nassau), numbering 11, produced the greater part of the output, the remaining 12 works comprising smaller concerns, scattered throughout the country. The number of persons employed in all these factories varies with the season, the spring and the summer being the busiest time of the year for the German tire factories. January seems to be the slowest month, the number of persons employed in 1927 having been 8,355, compared with 6,810 in 1926 and 9,692 in January, 1925. In July, 1927, the number of employes was 11,947 against 7,122 in the same month of the preceding year and 11,930 in 1925. There is, therefore, a marked improvement as compared with 1926, though the average of 1925 has not yet been reached. Wages and salaries paid amounted to 19,072,000 marks in 1927, 13,295,000 marks in 1926 and 17,601,000 marks in 1925, clearly indicating the rise in the wage scale during the past few years.

The raw material required by the tire industry had a total value of 118,056,000 marks in 1927, as against 96,272,000 marks in 1926 and 140,273,000 marks in 1925. The money expended on raw materials in 1927 represented 57 per cent of the total cost of production. Tire output and sales during 1927 are tabulated as follows:

	Production Number	Local Sales Number	Exports Number
Pneumatic Tires Passenger and Delivery Cars			
Covers ...	1,182,443	1,005,291	120,825
Tubes	1,170,013	948,722	149,599
Tires for trucks and buses			
Giant tires			
Covers ...	75,077	62,635	6,231
Tubes	59,096	45,288	6,457
Elastic Tires with Steel Rims	95,555	83,719	6,683
Solid Tires with Steel Rims	118,043	102,652	13,880
Solid Tires for Tractors, etc.	40,187	38,481*	.....
Tires for Motor Cycles			
Covers	444,197	385,597	15,768
Tubes	437,162	383,282	17,308
Cycle Tires			
Covers	16,426,933	13,611,585	1,034,511
Tubes	14,566,551	11,065,776	2,407,686
Combination Tires and Tubes	288,340	254,837	8,180
Other Tires			
Covers	5,573	5,423*	.....
Tubes	6,469	6,101*	.....

*Local sales and exports not separately mentioned.

The total value of the tire output and of the total sales is shown below:

	1927 Marks	1926 Marks	1925 Marks
Total Value of Output	205,570,000	164,564,000	208,129,000
Total Value of Sales	200,765,000	174,153,000	210,539,000
Of which Local Sales Were.	184,507,000	147,998,000	189,109,000
Exports	17,258,000	26,155,000	21,430,000

Gloria Factice

A new type of factice has been put on the market by the firm of Georg Crandel, oilworks, Johannis-Haagstrasse 18-20, Augsburg. This factice, known by the trade name Gloria, is a factice-paste dispersible in water and can easily be mixed with latex (latex, revertex, revultex), in any proportion. Fabrics rubberized with latex concentrate and Gloria paste have smooth surfaces and a pleasant feel to the touch. The factice preparation is highly concentrated, containing only 16 per cent water, and when rubbed into latex forms a homogeneous mixing. The factice particles are unusually small so that they mix very intimately with the rubber film, thus giving the desired smooth finish. Perfectly transparent rubber films less than 0.1 mm. can be produced with the use of this product. The firm supplies trial packages weighing from 1 kilo up at a reasonable price.

Russian Exports of Rubber Goods Increase

It is reported that the Soviet Government has made an agreement with a leading English company regarding the supply of rubber for the Soviet Union. It seems that the Soviet Government will accept the British offer in order to become independent of American rubber and is reported to have agreed to take certain quantities during the next three years.

In 1913, Russian exports of rubber goods included footwear to a value of 2,900,000 rubles, rubber sheet valuing 450,000 rubles and rubber waste representing 470,000 rubles. Comparative figures of exports against actual output during the last three years follow:

	1924-25, Rubles	1925-26, Rubles	1926-27, Rubles
Value of output	94,500,000	123,000,000	135,000,000
Footwear export	1,319,000	1,475,000	2,143,000
Other rubber goods	78,000	105,000	273,000
Total exports..	1,397,000	1,580,000	2,416,000
Per cent of total production	1.4	1.3	1.8

As the figures show, outputs have increased from year to year and the rate of the growth of exports at the same time has been even more rapid. It is planned to develop still further the export of footwear, particularly in the East. In the current year, the first important consignments of rubber footwear were exported to Western Europe. At present, a beginning has been made with the export of pneumatic tires to Western Europe.

The Rubber Industry in the Far East

Malaya

Relation Between Latex Bore and Yield

An interesting controversy has started between Herbert Ashplant, rubber mycologist, South India, and the Rubber Research Institute of Malaya regarding the former's claims to have discovered a method by which good yielders can be distinguished from bad ones in the nursery.

In his report of 1926-1927, Mr. Ashplant had hinted at his discovery of a distinct relation between the size of the latex tube and the yield of a tree. Further investigations gave him complete mathematical confirmation of this relation. Careful measurements of 239 trees that have been under observation for the last seven years have definitely established the fact that the correlation of the number of latex rings and yield was nothing like so close as that between latex tube bore and yield. He quotes instances of trees with a large number of rings but with small latex tube bore being poor yielders, and other trees where the number of rings was below the average but the bore unusually large, as being very good yielders.

Investigation started on plants only six months old showed that characteristic differences already existed. To the date of publication of his discovery, 1,000 nursery plants have been investigated and in every bed be found the following proportions: Plants with latex tubes of small average bore, 62 per cent; plants with latex tubes of large average bore, 33 per cent; plants with latex tubes of very large average bore, 5 per cent.

The importance of the discovery, if further substantiated, lies in the fact that the poor yielders can be eliminated in the nursery and that the method, when a suitable means for rapid and accurate measurement is found, is simple, and would completely put the Dutch investigations in the shade.

Research Institute Skeptical

If the press and individual planters have welcomed the news of the discovery with more or less enthusiasm, particularly because a British scientist had apparently bested the Dutch, the matter has been treated with great skepticism by the Research Institute of Malaya. Dr. Bryce, who is head of the Institute, replied in part:

"There is nothing new in Mr. Ashplant's report. The relation between yield and size of latex vessel has already been fully worked out by research workers in the Dutch East Indies. These employed the statistical method just as Mr. Ashplant has done, but on more than four times as many trees and moreover the work was carried much further than Mr. Ashplant has carried it. The results of this work have been known to the Rubber Research Institute for more than a year; they do not support Mr. Ashplant's claim, in fact they tend definitely in the opposite direction. The fact that these results have neither been published nor made use of is sufficient indication of their practical value to planters and research workers.

"Mr. Ashplant's conclusions have not been supported by the observations of the staff of the Botanical division of this Institute during the past 12 months. In the tapping test of an area of buddings now being carried out the highest yielding clone has latex vessels of much smaller bore than the lowest yielding clone. Had Mr. Ashplant's methods been employed in the area to sort out the different clones, the two best yielders would have been rejected and the worst one of all would have been given the premier position."

Ashplant's Reply

In a recent issue of the *Planters' Chronicle*, Herbert Ashplant replies to this criticism. He takes exception to the Research Institute statements that there is nothing new in the method and that the theory has already been fully investigated by research workers who have practically disproved it. To the first statement, he retorts that the only people who have ever thought the idea worth mentioning dismissed it in two or three lines. As to the second statement, he says that he has searched records of rubber research time after time for any evidence of previous work on the subject of latex tube bore but always in vain.

After having disposed of Dr. Bryce's remarks he goes on to say that new proof is daily being added and the evidence in favor of his discovery is overwhelming. The practical difficulties have now been removed and the technique for applying the selection test fully worked out. A test has been evolved that is reasonably dependable and sufficiently rapid for commercial use. The test is now in daily operation at the Experimental Station and will shortly be in operation on a large group of estates.

How the Test Works

An illustration of the fundamental soundness of the new test is offered by Mr. Ashplant. About a year ago, he says, six pieces of bud-wood were sent from a distant estate. The only information given was that they came from three trees, and that two pieces were taken from each tree. Six buddings were made from each of the six pieces, the respective sets being labeled A, B, C, D, E, F, since they could not be otherwise classified.

Recently samples were taken from the different sets of buddings and the latex tubes measured. This showed that the buddings belonged to three distinctive clones, which confirm their origin with amazing accuracy. The measurements were: A, 17.6; C, 17.8; E, 14.8; B, 14.6; F, 16.0 and D. 16.4. The tube measurements of each pair of buddings agree with one another within 1/3000 of a millimeter.

Rubber Stocks

Stocks of rubber in the Malayan restriction area at the end of June and July respectively were as follows:

	June 30		July 30	
	Estates Over 100 Acres Tons	Dealers' Stocks Tons	Estates Over 100 Acres Tons	Dealers' Stocks Tons
Federated Malay States	28,290	10,371	33,970	7,740
Straits Settlements	4,995	1,958	5,639	676
Johore	8,358	945	10,467	462
Kedah	2,849	140	3,000	83
Kelantan	299	122	376	77
Trengganu	Not available		223	17
Totals	44,791	13,536	53,675	9,055

A cable from Singapore states that the quantity of rubber available for export on November 1, is relatively estimated at 65,000 tons, and the total for November and December at 125,000 tons.

Planters' Conference

The fifth annual conference of the Incorporated Society of Planters was formally opened July 29, at Port Dickson. About 130 members and visitors were present. On the opening day three lectures were read, the first was a paper on "Seed Selection of Hevea," by Col. F. Summers. This was followed by one on "Diseases," by Dr. J. R. Weir, while the third was "Soil Bacteriology," by Dr. A. S. Corbet. All three men are connected with the local Rubber Research Institute.

N. E. I. Rubber Imports

The following table gives the imports of rubber from the various parts of the Dutch East Indies into Singapore and Penang during the first half of 1928 as compared with the first half of 1927.

	First Half 1927		First Half 1928	
	Wet Tons	Total Tons	Wet Tons	Total Tons
Atjeh	284	393	236	309
Sumatra E. Coast	10,372	11,905	8,229	9,384
Riouw	6,131	8,884	5,485	8,708
Djambi	15,456	15,997	17,160	17,448
Palembang	9,809	9,832	7,719	7,735
Sumatra W. Coast	493	507	470	477
Tapanoeli	1,807	1,836	538	627
South E. Borneo	11,341	11,629	10,442	10,754
West Borneo	10,433	12,284	6,465	8,073
Java	215	675	85	792
Banka & Billiton	1,197	1,271	441	473
Totals	67,538	75,213	57,270	64,780

It is interesting to note in the above tables that while all districts show a drop in the shipments of rubber, Djambi alone sent larger amounts than ever.

Netherlands East Indies

Interesting Papers On Rubber Growing

At the convention of the Soekaboemi Rubber & Planters' Association recently held at Bandoeng, Java, a number of interesting papers dealing with various rubber growing problems was read. Brief summaries of the papers follow:

Manuring Rubber

W. F. M. de Buy Wenniger discussed further results obtained with manuring on Djasinga. He found that on some lots constant manuring with 1¾ kilos of sulphate of ammonia per tree applied once in two years in the month of July during the wintering period caused an improvement in the foliage, a disappearance of dead tops, improved bark renewal, constant increase in output, decrease in cost price, and, with certain reservations, aided in the rapid recovery of trees from mold attacks. Some lots on the estate appear to require something besides a nitrogenous manure, some cases showing improved appearance after two treatments with sulphate of ammonia, yet there was no increase in yield. While in other cases there was improvement in yield but in March and April the trees did not look very healthy.

The difficulty of settling on any one kind of manure is illustrated by a comparison of the above summary with the results reported by Dr. J. G. J. A. Maas from tests taken on the government estate at Serpong, Bantam. Here a marked influence was found to be exercised by the use of phosphorous and potassium. Both growth and yields were favorably affected. On the other hand results with nitrogen manures were so far inferior to those obtained with potassium and phosphorous, which are also much cheaper, that the former are now no longer used on Serpong.

Rejuvenating Estates

Rejuvenating estates was treated by A. J. Zwaardemaker, who reviewed Hamaker's tests and described his own experience. He had 50 per cent of old, poor yielders on a certain section removed and then planted up seedlings from known good producers. At first there is some loss in output owing to the removal of the old trees but this is not considerable and if the process is started in time and carried out systematically this loss is soon made up and as more of the new plants reach maturity the output shows a gratifying increase over former crops.

Mr. Zwaardemaker points out that older estates will have to adopt some such method of rejuvenating areas if they do not want to be outclassed by the younger estates which are all planted with superior material and of which some already show outputs of more than 600 kilos per bouw (bouw = 1.75 acres, therefore approximately 750 pounds per acre), in the tenth year, with a tapping system of 175 days, and a cut of at most ¼ of the circumference.

Restoration and Rejuvenation

De Buy Wenniger gives a different method of solving the same problem as that discussed by Zwaardemaker. Restoration of backward areas on poor soil by terracing, digging pits, planting green manures and using artificial manures is practicable and profitable on Djasinga estate. Drastic pruning of dying crowns of trees was a powerful aid. Rejuvenating such areas is less advantageous for the first 8 to 10 years than restoration but in the long run must be more profitable. He concludes that a system of combined restoration and rejuvenation will be the most economical method of procedure.

H. J. Holst Pellekaan was another planter who has been impressed by the need of older estates to bring their holdings on a par with the newer estates, which because of their ability to produce more cheaply owing to the superiority of their material and methods, prejudice the existence of the estate laid out in a day when any kind of rubber seed was planted. The future of plantation rubber depends on a low price necessitating a low cost price which the older concerns can only obtain by laying out new gardens planted with superior material or by a system of intensive rejuvenation of the old lands.

Plasticity of Rubber

The changes in plasticity which crude rubber undergoes in the tropics or storing was the subject of investigation by Dr. O. de Vries in the *Archief voor de Rubbercultuur*, July, 1928. Samples prepared in 1916 and stored in a cupboard for 12 years, when examined recently showed no serious signs of deterioration. Tensile strength had decreased, rate of cure and slope had changed but little. There was a marked decrease in viscosity but the plasticity had changed comparatively little; the samples had become somewhat harder. Samples from 1920 to 1923 in some cases became much harder after one year and sometimes after two years. Samples of plantation rubber stored in December, 1924, were fairly constant as regards plasticity during the first two years. This was the case both for the softer and the harder samples. They did not begin to harden until the third year and in the beginning of 1928 several had become quite hard. From this it appears that the recent standardized methods of preparation help to keep plasticity constant for a longer time. Some samples examined after a sea voyage to America and back showed no abnormal properties. Changes arising when rubber is stored in Europe, as when it freezes, can naturally not be investigated in Java. This should get the attention of investigators in Europe and America.

Native Rubber

An official report points out that the continued low prices of rubber have reduced outputs from native holdings; however, native rubber is still a factor to be reckoned with and there will not be any considerable decline in the native industry. Authorities are trying to keep the industry going by advising more economical production methods, as careful thinning, the introduction of periodical tapping so as to affect favorably the wage of the tapper working on a fifty-fifty basis (half the tapper's crop harvested goes to the owner and half is retained as his pay), so that exploitation may continue for a longer time when circumstances are unfavorable.

On the whole there is little effort made to have the native invest more money in his holding for the main source of strength of the native planter lies in the fact that his capital outlay is negligible. Good work is being done in forcing an improvement in the quality of the native product by testing it and thus reducing adulteration to a minimum. In some localities the natives have discovered the advantages of improving their rubber and are not adulterating to the same extent as formerly.

Ceylon

Ceylon rubber producers are not tapping all outs, declared C. H. Figg at the recent annual meeting of the Colombo Rubber Traders' Association. Ceylon as a whole is harvesting the crop which is the cheapest to produce, taking into consideration such factors as reserves of bark, labor supply, etc. There has been no scramble for labor in the low-country and numerous instances are known where estates are leaving areas untapped or are continuing the system of light tapping initiated during restriction. Other owners who have tea as well as rubber are not tapping their rubber until prices improve, and are employing the labor thus freed on their tea areas.

Rubber exports from Ceylon during the first nine months of the current restriction year were as follows:

	Exportable Maximum Tons	Actual Exports Ceylon Rubber Tons	Exports Imported Rubber Tons
Nov., 1927	3,815	4,110	435
Dec., 1927	3,815	4,165	472
Jan., 1928	3,815	4,404	549
Feb., 1928	3,815	4,409	535
March, 1928	3,815	3,533	542
April 1, 1928....	3,815	3,212	272
May, 1928	3,815	3,302	400
June, 1928	3,815	3,065	300
July, 1928	3,815	4,534	216

Outstanding unused coupons as of July 31, 1928, 7,108 tons.

Ceylon Rubber Stocks

The total stocks of Ceylon rubber July 31, 1928 amounted to 11,600 tons, of which 6,000 tons were on estates of over 100 acres, and 5,600 were in the hands of dealers. These figures include the normal working stocks of the dealers and on estates which are estimated to amount to between 7,000 and 8,000 tons.

Rubber Patents, Trade Marks and Designs

Machinery Patents

United States

1,681,064. STOCK WINDOFF. Power driven means are provided for unwinding strip stock from a supply reel where the stock is of such low tensile strength that unwinding by pulling would break it. Means are also provided for varying and governing the speed by tension of the stock. H. D. Stevens, assignor to The Firestone Tire & Rubber Co., both of Akron, O.

1,681,146. AIRBAG. This is an improved inflatable airbag for expanding and forming flat band tire casings from a transversely flat annulus into the shape of a tire without injuriously stretching the bands. Another purpose is to provide a bag which will function without a support and without the usual bead clamping rings. F. B. Pfeiffer, Akron, O.

1,681,247. STRIP CUTTER. By means of this machine worn or discarded rubber truck tires or other similar heavy strips of vulcanized rubber may be split or divided annularly into a number of long strips as a step preliminary to cross-cutting them. T. Mulholland, assignor by direct and mesne assignments to Valley Rubber Co., both of Wheeling, W. Va.

1,681,249. SOLID BALL MACHINE. This is designed to turn from rectangular blocks of rubber solid playing balls of spherical form. The ball shape is given to the rubber held between two cup-shaped grinding sockets of abrasive material, each cup being on the end of a separate shaft maintained in alinement. T. Mulholland, assignor to Valley Rubber Co., both of Wheeling, W. Va.

1,681,680. PNEUMATIC TIRE BEAD. This invention provides a bead with reinforcement which may be easily and cheaply manufactured and is substantially unstretchable. The reinforcing material element is comprised of three strands of tension wires held in parallel relation by a thinner strand woven diagonally back and forth. A ring of three wraps of such an element may be made on a mandrel with a rubberized fabric ply inserted between, also above and below them and the bead construction consolidated by curing in a mold. R. C. Pierce, assignor to National Standard Co., Niles, Mich.

1,681,973. TIRE VULCANIZING. The tire is expanded against a mold by forcing a moist plastic material into the tire in direct contact with its inner surface while the tire is sufficiently cool to be impermeable to the plastic. When the plastic is relieved of a part of its moisture it is stiffened and serves as a mechanical support against retraction of the inner plies of the tire. J. W. Brundage, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,682,494. CEMENT MACHINE. This invention provides simple and economical means readily attachable to the existing types of cementing machines to automatically free the lower roller from any adhering cement. H. G. Ellis, Waltham, and H. A. Mathis, Watertown, assignors to Hood Rubber Co., Watertown, all in Mass.

1,682,620. ELECTRICAL VULCANIZER. By this invention pressure can be applied to the mold in which the article to be vulcanized is enclosed, and electric current is simultaneously induced in the mold or in the core on which the article to be cured is formed or carried. Joseph Ledwinka, assignor to E. G. Budd Mfg. Co., both of Philadelphia, Pa.

1,683,318. SPEED CONTROLLING DEVICE. This invention covers a device controlling the relative speed of two machines, for example, a mechanism for feeding continuous strip material into a reserve loop and a mechanism for feeding the material out of the reserve loop, as in continuously calendering a strip of rubber stock and feeding it into a reserve loop from which it is withdrawn intermittently or at different speeds for processing beyond the loop. H. E. Waner, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,680,777. VALVE STEM LOCKING MEANS FOR TUBE MOLDS. W. L. Fairchild, New York, N. Y.

1,681,070. SUPPORTING STAND. C. Uschmann, assignor to The Firestone Tire & Rubber Co., both of Akron, O.

1,681,086. REPAIR VULCANIZER. T. Bell, Richmond, Va.

1,681,178. VULCANIZER. H. Erikson, Lowell, Mass.

1,681,248. RUBBER STRIP TRIMMING APPARATUS. T. Mulholland, assignor, by direct and mesne assignments, to Valley Rubber Co., both of Wheeling, W. Va.

1,681,455. PATCH VULCANIZER. H. J. Anderson, St. Paul, Minn.

1,681,713. TIRE MOLD. E. W. Thurlow, Middle Brighton, assignor to Vulcan Rubber Proprietary Ltd., Kensington, both in Victoria, Australia.

1,682,691. CORE FOR CASING AMPLIFYING HORNS. F. W. Temple, Cicero, assignor of one-half to W. P. Crockett, Chicago, and one-fourth to A. Marchev, Cicero, both in Ill.

1,683,322. VALVE. B. B. Annis, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

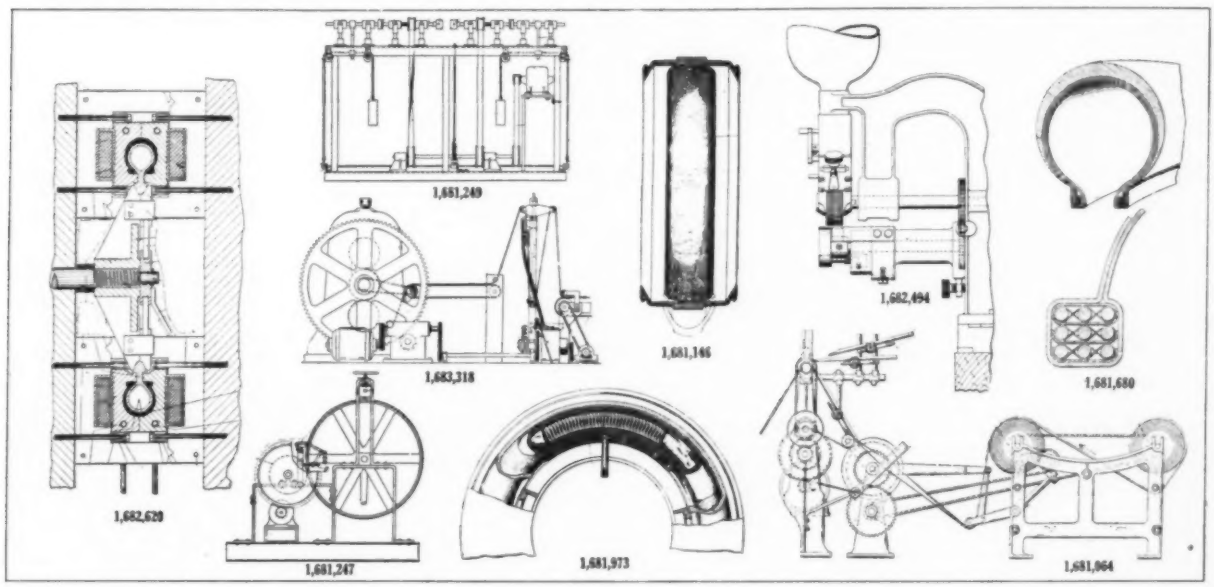
1,683,343. TIRE PRESSURE INDICATOR. J. H. Gartner, San Francisco, Calif., assignor of one-fifth to P. S. Higgins, one-fifth to J. D. Skelly and one-fifth to W. Schackleton.

1,683,441. TIRE BUILDING BLOCK. R. G. Bone, Milledgeville, Ga.

Dominion of Canada

282,476. SLITTER AND CUTTER. The Cameron Machine Co., assignee of J. A. Cameron, both of New York, N. Y., U. S. A.

282,477. SLITTER AND CUTTER. The Cameron Machine Co., assignee of J. A.



Rubber Patents, Trade Marks and Designs

Cameron, both of New York, N. Y., and R. M. Johnstone, Summit, N. J., both in the U. S. A.

282,496. INNER TUBE MOLD. The Gillette Rubber Co., assignee of R. W. Hutchens and A. R. Krause, all of Eau Claire, Wis., U. S. A.

282,528. TIRE VULCANIZER. La Société de Procédés "Fit" Grenoble, assignee of E. Garabiol, Corenc, par la Tronche, both of Isère, France.

282,529. TIRE TREAD REMOVING MECHANISM. La Société des Procédés "Fit" Grenoble, assignee of E. Garabiol, Corenc, par la Tronche, both of Isère, France.

282,797. TIRE BUILDING FORM. F. L. Johnson, Akron, O., U. S. A.

283,026. WINDING MACHINE. The Cameron Machine Co., assignee of J. A. Cameron, both of New York, N. Y., U. S. A.

283,027. WINDING MACHINE. The Cameron Machine Co., New York, N. Y., assignee of R. M. Johnstone, Roselle Park, N. J., both in the U. S. A.

United Kingdom

292,112† REPAIR VULCANIZER. E. Moulin and G. Mouton, 32 Coursdes Fosses, Langon, Gironde, France.

292,154† FOOTWEAR VULCANIZER. F. Nielsen, Grandview Parade, Epping, Sydney, Australia.

292,341. TIRE CORE. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, and H. Willshaw, Fort Dunlop, Birmingham.

292,573† SPLITTING MACHINE. P. Jacout and M. Breton, 29 Route d'Arras, Thumesnil, Lille, Nord, France.

292,905† TIRE MOLD. Goodyear Tire & Rubber Co., 1144 East Market St., assignee of H. A. Brittain, 158 Portage Drive, both of Akron, O., U. S. A.

293,071. WATER DISPERSION MILL. Anode Rubber Co., Ltd., 15 Throgmorton Ave., London. (P. Klein, 90 Thökölyut, Budapest, Hungary, and A. Szegvári, Akron, O., U. S. A.)

293,072. MIXING APPARATUS. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, R. D. McKay, H. Willshaw, W. G. Gorham and R. F. Lee, Fort Dunlop, Erdington, Birmingham.

293,073. RUBBER LATEX PUMP. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, H. Willshaw, W. G. Gorham and R. F. Lee, Fort Dunlop, Erdington, Birmingham.

293,119. TIRE MOLD. J. F. Barnes and W. T. Barnes, 180 Camberwell Rd., Upper Hawthorn, and M. D. Kennedy, 21 Rotherwood St., Richmond, both in Victoria.

293,519. RUST REMOVING. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, and D. F. Swiss, Fort Dunlop, Erdington, Birmingham.

†Not yet accepted.

Germany

464,464. BEVELING TUBE ENDS. The Dunlop Rubber Co., Ltd., London. Represented by Dr. R. Wirth, C. Weihe, Dr. H. Weil, M. M. Wirth, Frankfurt a. M., and T. R. Koehnhorn, and E. Noll, Berlin S. W. 11.

464,465. VULCANIZING PRESS. Paul Hartmann, Maximininenstrasse 40, Cologne.

464,647. FEEDING PENCIL ENDS. Firma Fr. Ehrhardt, Nurnberg.

Process

United States

1,680,823. VULCANIZING A COMPOSITE RUBBER ARTICLE. E. S. Teed, assignor to The Textile Rubber Co., both of Akron, O.

1,682,124 and 1,682,125. CURING TUBES. D. E. Hennessy, Akron, O., assignor to The Fisk Rubber Co., Chicopee Falls, Mass.

1,682,223. MEANS RELATING TO THE MANUFACTURE OF WATER BOTTLES. H. A. Hands, assignor to Hood Rubber Co., both of Watertown, Mass.

1,682,238. FORMING TIRES. J. F. Palmer, Buffalo, N. Y.

1,682,876. COOLING TIRE TREADS. H. C. Weisse, Milwaukee, Wis., assignor to The Fisk Rubber Co., Chicopee Falls, Mass.

1,682,922 TIRE BEAD CONSTRUCTION. C. W. McKone, Canton, O.

1,682,923. PRODUCING RUBBER TUBES. C. E. Maynard, Northampton, assignor to The Fisk Rubber Co., Chicopee Falls, both in Mass.

Dominion of Canada

282,679. COIL MANUFACTURE. The Cameron Machine Co., New York, N. Y., assignee of R. M. Johnstone, Roselle Park, N. J., both in the U. S. A.

United Kingdom

292,170† JOINING COMPOUND FABRICS. Deutsche Gasgluhlicht Auer-Ges., 16 Rotherstrasse, Berlin, Germany.

293,419† RECOVERING FIBER. Naamlooze Vennootschap Vereenigde Nederlandsche Rubberfabrieken, assignees of D. F. Wilhelmi, both of Heveadorp, Doorwerth, near Arnhem, Holland.

†Not yet accepted.

Chemical Patents

United States

1,680,856. TREATING LATEX. Preparation of latex to form an uncoagulated composition and depositing rubber from the latex thus prepared directly on a porous form in desired shape. S. M. Cadwell, Leonia, N. J., assignor to The Naugatuck Chemical Co., Naugatuck, Conn.

1,680,857. VULCANIZED LATEX. Preparation of a vulcanized latex by compounding to become vulcanized to a soft elastic product which by further compounding can be caused to be vulcanizable to a hard rubber at temperatures below approximately 212 degrees F. S. M. Cadwell, Leonia, N. J., assignor to The Naugatuck Chemical Co., Naugatuck, Conn.

1,680,858. VULCANIZED LATEX. A process for manufacturing rubber articles from latex which consists in vulcanizing latex in the presence of a salt of a thiol acid, and depositing the rubber from the latex thus obtained directly on a porous form in the shape desired. S. M. Cadwell, Leonia, N. J., assignor to The Naugatuck Chemical Co., Naugatuck, Conn.

1,680,862. TREATING RUBBER. Treating rubber with an organic acid capable of forming a water soluble soap until the mass has assumed a putty-like consistency, and neutralizing the residual acidity, with a base capable of forming a water soluble soap. Harold E. Cude, Floral Park, N. Y., assignor to The Naugatuck Chemical Co., Naugatuck, Conn.

1,680,908. PETROLEUM FROM SCRAP. The destructive distillation of rubber hydrocarbons in the presence of a naturally occurring bleaching earth. Hirotaro Nishida and Keiichi Shimada, Kiriu, Japan.

1,680,915. TREATING GROUND RUBBER-FIBER WASTE. The finely ground waste is mechanically worked in the presence of a soap-forming fatty acid to a putty-like consistency. Then working into it caustic soda solution and finally beating the product in water containing an alkali and a protective colloid until the rubber is completely removed from the fiber and in dispersed form. Reed P. Rose, Jackson Heights, N. Y., assignor to The Mechanical Rubber Co., Cleveland, O.

1,681,806. ACCELERATOR. The use of tritolylguanidine as an accelerator of vulcanization. Ralph V. Heuser, Burrage, assignor to Albert C. Burrage, Jr., Ipswich, both in Mass.

1,681,891. ABRASIVE ARTICLES. Abrasive material bonded by rubber latex. Duane E. Webster, assignor to Norton Co., both of Worcester, Mass.

1,682,397. RUBBER AND RESIN COMPOUND. A waxy solution of about 10 per cent of rubber dissolved in paracoumaron resin having a melting point of about 126 degrees C. Stuart P. Miller, Philadelphia, Pa., assignor to The Barrett Co., New York, N. Y.

1,682,530. FLOORING. Dried non-vulcanized rubber latex and a filler. C. C. Loomis, Yonkers, assignor to Latex Products, Inc., New York, both in New York.

1,682,728. ACCELERATOR. The carbon disulphide derivative of an amine with the reaction product of a mercaptothiazole compound upon a chlorine derivative of carbon disulphide. William P. ter Horst, assignor to The Rubber Service Laboratories Co., both of Akron, O.

1,682,729. ACCELERATOR. An organic derivative of ammonia with a product obtained by reacting a mercaptothiazole compound with a chlorine derivative of carbon di-sulphide. William P. ter Horst, assignor to The Rubber Service Laboratories Co., both of Akron, O.

1,682,857. MANUFACTURE OF RUBBER. The process comprises substantially uncoagulated caoutchouc at a temperature below those ordinarily employed in hot vulcanizing methods under such conditions as to preclude any substantial coagulation of the caoutchouc during the vulcanization. Philip Schidrowitz, London, assignor of Vultex, Ltd., Jersey, Channel Islands, both in England.

Rubber Patents, Trade Marks and Designs

Dominion of Canada

282,491. Rubber Processing. A method of improving properties of rubber derived from concentrated alkaline latex which comprises adding to it an acidic material, drying and recovering a rubber of a reduced alkalinity. The Dominion Rubber Co., Ltd., Montreal, assignee of Willis A. Gibbons, Great Neck, L. I., N. Y., U. S. A.

282,883. Accelerator. The reaction product of sulphur and an aryl dithiocarbamate containing substitutions in the aryl radical. The Goodyear Tire & Rubber Co., assignee of L. B. Sebrell, both of Akron, O.

282,994. Waterproof Material. An artificial mass made of waste material heat treated in water containing a zinc salt and an acid after which the material is impregnated with a rubber solution and formed in molds under pressure. C. G. A. Lundberg, Tidan, Sweden.

United Kingdom

292,103.† Artificial Rubber. In an example, an emulsion of 3 c. c. of cow's milk, 20 c. c. of isoprene and 3 c. c. of 3 per cent hydrogen peroxide is heated to 95 degrees C. for 4 to 5 days in a closed vessel. I. G. Farbenindustrie, A. G., Frankfort-on-Main, Germany.

292,681. Road Composition. Molded interlocking rubber blocks vulcanized quickly with a low temperature accelerator. J. Jacques and F. W. McMahon, both in Wanstead, London.

292,704. Embossed Rubber. Irregular embossed markings are produced on the surfaces of rubber articles obtained by deposition from aqueous dispersions, by placing the articles between two surfaces, such as of metal, and vulcanizing in boiling water or an aqueous solution. Light pressure, as that produced by rubber bands, may be applied to the plates, etc., which may be plain or engraved. Dunlop Rubber Co., Ltd., London, and G. G. Thornton, Fort Dunlop, Erdington, Birmingham.

292,754. Variegated Rubber. Sheets of rubber are coated on one or both sides with a rubber solution of different color, and assembled into blocks, which may be deformed by pressure, the blocks being subsequently sliced to produce sheets having fine grain-like markings. Macintosh & Co., Ltd., S. A. Brazier and G. F. Thompson, Manchester.

292,813. Gas Proof Fabrics. A layer of the plastic glue composition may be spread over one face of each of two layers of fabric which may then be joined so that the plastic composition is between them and a layer of rubber is then formed on the outer faces of the joined layers. G. Cardile, trading as Industria Articoli Caoutchouc, I. A. C., Cirie, Turin, Italy.

292,964.† Treating Rubber Latex. Latex is rendered coagulable by heat by addition of oxides or hydrates of di-and trivalent metals and a salt of ammonium such as the sulphate. Salts of the same metals may be added. Latex thus prepared is used for the direct production of rubber articles. Soc. Italiana Pirelli, Milan, Italy.

†Not yet accepted.

293,061. Drying Rubber Articles. Articles produced by immersing a form in aqueous dispersions of rubber are dried by maintaining one side at a higher temperature than the other and permitting the escape of water from the other side on which an impervious dried skin is prevented from forming until the article is dry. Anode Rubber Co., Ltd., London.

293,095. Electrolysis of Rubber. Rubber or other substance is deposited from a latex to which is added a salt of the metal employed as anode or an aqueous solution thereof, the amount of salt being insufficient to effect coagulation. The voltage should be insufficient to electrolyse water, e.g. 1.5 volts. W. A. Williams, 1 Lennox St., Edinburgh, Scotland.

293,111. Ornamenting Articles. A roughened, crinkled, or ornamental surface is given to rubber articles, especially those made from latex by dipping, by giving them a final coating of concentrated latex, which may be vulcanized, partially drying by heat so that a skin is formed, acting on the surface with a solvent or softening agent and then completing the drying. S. D. Sutton, 2 Glasshouse St., London, and Veedip, Ltd., 123A Windmill Road, Brentford, Middlesex.

293,293.† Electric Insulation. Insulating units are obtained by applying liquid insulating compounds of rubber, etc., to a solid carrier of transparent viscose-like cellulose compound, substantially free from fibers, and drying and solidifying the coating obtained. Elektra-Lack-Werke Ges. System. Dr. Kronstein, Karlsruhe, Baden, Germany.

293,343. Electric Endosmose of Rubber. A means for determining the current density necessary for the electrophoretic deposition of rubber. Dunlop Rubber Co., Ltd., London, and F. H. Lane, Fort Dunlop, Erdington, Birmingham.

293,502. Rubber Composition. Viscous liquid or semi-solid accelerators, anti-aging agents or softeners are mixed or combined with colophony before compounding them with rubber. The substances may be combined by melting them together, or by dissolving them in a common recoverable solvent, as benzene or alcohol. The substance is formed into flakes which mill smoothly into the mix. Typical mixtures are 9 parts of rosin and 1 part of oleic acid; 3 parts of rosin and 1 part of aldol α-naphthylamine; 3 parts of rosin and 1 part of crotonaldehydeaniline. Hardened rosin and substances such as zinc oxide or clay may be added to vary the consistency. Dunlop Rubber Co., Ltd., London, and D. F. Twiss, Fort Dunlop, Erdington, Birmingham.

293,535. Rubber Tubing. Rubber tubing of narrow bore is formed from an aqueous dispersion of rubber by deposition on a fusible core or mandrel which is removed by fusing. Dunlop Rubber Co., Ltd., London, and A. W. T. Hyde, Fort Dunlop, Erdington, Birmingham.

General

United States

August 14, 1928*

1,680,318 Assembly Disk for Elastic Material. C. E. Callahan, assignor to The Pioneer Rubber Co., both of Willard, O.

1,680,442 Foot Mat. M. E. Anderson, Minneapolis, Minn.

1,680,528 Display Form. J. A. Lalonde, Montreal, Quebec, Canada.

1,680,963 Cushion. M. E. White, High Point, assignor of one half to G. W. Fleming, Clinton, both in N. C.

August 21, 1928*

1,681,167 Golf Ball. G. W. Beldam, Ealing, England.

1,681,211 Shoe. W. R. Barclay, Leicester, England, assignor to United Shoe Machinery Corp., Paterson, N. J.

1,681,548 Sandal. J. Marcus, Brooklyn, N. Y.

1,681,677 Bumper. A. J. Musselman, Chicago, Ill.

1,681,838 Faucet Connection. J. E. Conklin, Brooklyn, N. Y.

August 28, 1928*

1,681,961 Heel. G. E. Warren, Swampscott, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

1,681,999 Stamp. C. L. Smith, assignor to The Franklin Printing Co., both of Tampa, Fla.

1,682,302 Tire. I. W. Miller, Allentown, Pa.

1,682,306 Tank Valve. R. M. Pierson, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,682,707 Footwear Repair Part. W. A. Owen, Akron, O.

September 4, 1928*

1,682,746 Train Retarder. J. E. Finnessy, Pittsburgh, Fa.

1,682,836 Closure Means for Inflatable Rubber Bodies. I. Dorogi and L. Dorogi, Budapest, assignors to Dr. Dorogi és Társa Gummigyár R. T., Budapest-Albertfalva, both in Hungary.

1,682,858 Bumper. H. E. Sipe, New York, N. Y.

1,682,912 Garter. L. F. Keyser, Akron, O.

1,683,208 Tire. J. Powell, Carlton, Victoria, Australia.

1,683,246 Nipple. R. T. Griffiths, assignor to The Miller Rubber Co., both of Akron, O.

1,683,330; 1,683,331; 1,683,332; 1,683,333; 1,683,334 Spring Shackle.. R. H. Chilton, assignor to The Inland Mfg. Co., both of Dayton, O.

1,683,336 Plumbing Device. T. P. Cummings, Chicago, Ill.

1,683,344 Steering Wheel. H. D. Geyer, assignor to Inland Mfg. Co., both of Dayton, O.

1,683,429 Plug for Cleaning Tubes. E. Walker, Grantwood, N. J.

1,683,454 Inner Tube. W. Fetter, Baltimore, Md.

1,683,471 Pressure Gage. H. P. Kraft, Ridgewood, N. J., E. J. Phillips and E. A. Darr, executors of H. P. Kraft, deceased.

1,683,510 Corset. O. C. Wiese, Newton, Mass.

*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

Rubber Patents, Trade Marks and Designs

Reissues

17,076 GOLF CLUB. C. J. Jahant, assignor to The General Tire & Rubber Co., both of Akron, O. Filed Jan. 10, 1928. Serial No. 245,713. Original No. 1,636,514 dated July 19, 1927. Serial No. 148,221, filed Nov. 13, 1926.

Dominion of Canada

September 4, 1928

282,968 SWIMMING DEVICE. S. Gates, Braddock, Pa., U. S. A.

United Kingdom

August 9, 1928

292,138† SOLE. Naamlooze Vennootschap Vereerigde Nederlandsche Rubber-Fabrieken, Heveadorp, Doorwerth, near Arnhem, Holland.

292,485† SHOCK ABSORBER. Compagnie D'Applications Mecaniques, 42 Rue Franklin, Ivry-Port, Seine, France.

August 15, 1928

292,769 CABLE. C. J. Beaver, Bell Place, Stamford Rd., Bowdon, Cheshire, and W. T. Glover & Co., Ltd., Trafford Park, Manchester.

August 22, 1928

292,847 SWIMMING SHOE. H. Beckert, 20 Zietenstrasse, Lobtau, Dresden, Germany.

292,853 GLAZING STRIP. A. E. Dutfield, 94 Pendle Rd., Streatham, London.

292,983† CABLE. British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, assignees of E. H. Lewis, University Club, Bridgeport and C. O. Hull, 315 Palisade Ave., New Bridgeport, both in Conn., U. S. A.

293,086 UPHOLSTERY STUFFING MATERIAL. C. Macintosh & Co., Ltd., and F. W. Warren, 2 Cambridge St., Manchester.

293,124 BALL. C. Macintosh & Co., Ltd., S. A. Brazier and L. R. Ridgway, 2 Cambridge St., Manchester.

293,140 GLASS CLEANER. H. Leah, Blenheim, Junction Rd., Deane, Bolton.

293,194 WEATHER EXCLUDERS. A. A. Godin, 142 Uxbridge Rd., Shepherds Bush, London.

August 29, 1928

293,429† ELASTIC STOCKING. F. Damon, 3 Rue Nicolai, Lyons, France.

293,448† TIRE. J. F. Long, Herries St., Toowoomba, Queensland, Australia.

293,537 WINDOW BUFFER. India Rubber Gutta Percha & Telegraph Works Co., Ltd., 106 Cannon St., London. (G. C. Lowe, 7 Old Court House St., Calcutta, India.)

293,593 BATHING CAP. F. C. Jones, Reliance Rubber Works, Formosa St., Paddington, London.

293,638 TIRE. E. E. Wittkopp, 2809 South Keeler Ave., Chicago, Ill., U. S. A.

†Not yet accepted.

Germany

464,447. BOXER TOY. Erich Jesz, Dortmunderstrasse 162, Castrop-Rauxel.

464,550. RELEASE CHAIN HANDLE. Rheinische Gummi-Gesellschaft W. Klotz & Co., Schutzenstrasse 64, Dusseldorf.

464,513. ATTACHMENT FOR DROP CENTER RIMS. Fred. Lionel Rapson, Chertsey, Surrey, England. Represented by W. Schwaebsch, Stuttgart.

465,813. TIRE TREAD. A. G. Metzeler & Co., Gummiwarenfabrik, Westendstrasse, 131, Munich.

Designs

1,039,312. PNEUMATIC CUSHION. Continental Caoutchouc und-Gutta Percha Compagnie, Hannover.

1,039,447. SPONGE. Emund Schmidt, Christstrasse 22, Berlin-Charlottenburg.

1,039,466. EXCHANGEABLE HEEL. Itto Hofmann, Freiburg, i. S.

1,039,478. PROTECTIVE COVER FOR SHOES. H. R. Friderich, Pirmasens, Pfalz.

1,039,688. HEEL PROTECTOR. Julius Scherff, Evingsen, i. 2.

1,039,725. STOCKING PROTECTOR. Radium Gummiwerke G. m. b. H., Koln-Dellbruck.

1,039,759. INSERT FOR TIRE TREADS. Robert Ontrup, Oststrasse 26, Bielefeld.

1,039,796. SPONGE WITH HANDLE. Karl Bayer, Herrenkellergasse 1, Ulm a. d. D.

1,039,886. ANTI-SKID TIRE. Dr. Max Jacoby, Friedrichstrasse 133, Berlin N. 24; Paul Schonhofer, Chaussestrasse 122, Berlin N. 4, and Fritz Rensen, Winsstrasse 48, Berlin N. O., 55.

1,040,315. SEMI-SOLID TIRE. Erdmann Rosenhain, Gunzenlehstrasse 1, Munich.

1,040,427. INSULATED WIRE. Siemens-Schuckertwerke a. G., Berlin-Siemensstadt.

1,040,694. FAUCET VALVE. Alexander Tauber, Fritschestrasse 55, Berlin-Charlottenburg.

1,040,895. MATTING. Franz Clouth Rheinische Gummiwarenfabrik A. G., Koln-Nippes.

1,041,191. ABDOMINAL BAND. Nickel & Co., Tauentzienstrasse 54, Breslau 2.

Prints

United States

11,153 GOOD-WINGFOOT-YEAR MEANS GOOD WEAR. Tires. The Goodyear Tire & Rubber Co., Inc., Akron, O. Published July 1, 1928.

11,165 AND HE WONDERS WHY HE WASN'T PROMOTED. Garters. A. Stein & Co., Chicago, Ill. Published May 2, 1928.

11,166 AND HE WONDERS WHY SUCCESS NEVER ARRIVES. Garters. A. Stein & Co., Chicago, Ill. Published May 2, 1928.

11,167 AND HE WONDERS WHY THEY LAUGHED—AND HOW. Garters. A. Stein & Co., Chicago, Ill. Published May 2, 1928.

11,168 AND HE WONDERS WHY SHE SAID "NO." Garters. A. Stein & Co., Chicago, Ill. Published May 2, 1928.

Trade Marks

United States

Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section (1) (b) are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the later act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

August 14, 1928

Act of February 20, 1905

245,362 VULCA-LOCK—certain named rubber and sheet rubber. The B. F. Goodrich Co., New York, N. Y.

245,465 Fancy design beneath which are the words: "SEMPER SURSUM"—hard rubber material in sheet, rod and tubular form. Dr. Heinr. Traun & Söhne, Vormals Harburger Gummi-Kamm-Compagnie, Hamburg, Germany.

August 21, 1928

Act of February 20, 1905

245,610 CLOSERITE—rubberized fabric pencil case. John Samuels, New York, N. Y.

245,696 SLICK JIM—automobile top dressing and refinisher for rubber goods, etc. V. A. Minor, Columbus, O.

245,700 AMERICAN SPORT—tires and tubes. Phelps Tire & Rubber Co., Garfield, N. J.

245,711 CAMEO—pneumatic tires and tubes. The American Rubber & Tire Co., doing business as The Artco Rubber & Tire Co., Akron, O.

245,789 Circle and triangle containing the word: "DOPP"—retorts, caldrons, tanks and boilers for heating rubber, etc. Sowers Mfg. Co., Buffalo, N. Y.

245,817 CRISS-CROSS—tire protectors, repair outfits, patches and bandages. The Goodyear Tire & Rubber Co., Akron, O.

245,821 IDENTO—rubber stamps and type. D. Swisher Mfg. Co., Chicago, Ill.

245,855 Fancy design containing the word: "MILLER"—pneumatic tires and inner tubes. The Miller Rubber Co., Akron, O.

August 28, 1928

Act of February 20, 1905

245,920 CERTIFYD—toilet combs. E. Morris Mfg. Co., Detroit, Mich.

245,945 EARL—dress shields. The S. Kann Sons Co., Washington, D. C.

245,993 THE DAWN—dress shields. New York Shield Co., New York, N. Y.

245,994 TWILIGHT—dress shields. I. B. Kleinert Rubber Co., New York, N. Y.

246,052 Quadrangle containing the word: "DISPERSOL"—rubber softener. Edward Maurer, New York, N. Y.

246,061 AURORA—dress shield. I. B. Kleinert Rubber Co., New York, N. Y.

Act of March 19, 1920

246,089 RAYNSHU—boots, shoes, overshoes and arctics. Cambridge Rubber Co., Cambridge, Mass.

September 4, 1928

Act of February 20, 1905

246,130 Design containing the letter: "S," and the words: "IRON DUKE"—tires and tubes. Southern Tire & Rubber Co., Augusta, Ga.

Rubber Patents, Trade Marks and Designs

246,154 TRAIL BLAZER—tires. Montgomery Ward & Co., Inc., Chicago, Ill.

246,258 SAVE-ARCH—shoes of leather, cloth, rubber, etc. The Stern-Auer Co., Cincinnati, O.

246,285 NORTH WOODS—clothing, boots and shoes of leather, rubber, fabric, etc. Von Lengerke & Antoine, Chicago, Ill.

246,308 Representation of a portion of a pneumatic inner tube—inner tubes for pneumatic tires. F. G. Schenuit, Baltimore, Md.

246,325 CACTUS—tire patches and boots. C. J. Evans, doing business as Cactus Mfg. Co., Los Angeles, Calif.

246,339. HOLLYWOOD SCREEN STAR—shoes and slippers of leather, rubber, fabric, etc. Elias-Katz Shoe Factories, Los Angeles, Calif.

246,385 Fancy design containing the word: "FASHION"; above the design the word: "Foot," and beneath the design the word: "WEAR"—soles, linings and shoes of leather, rubber and fabric. The Epstein Brothers Shoe Co., Cleveland, O.

246,389 EASY FEET—combination rubber and leather heel pad for shoes, slippers and pumps. The Scholl Mfg. Co., Inc., Chicago, Ill.

246,413 SUNPROOF—chemical preparation for use in compounding rubber. The Naugatuck Chemical Co., New York, N. Y.

246,438 PARIMODE—shoes of leather, rubber and fabric. Senack Shoe Co., St. Louis, Mo.

Dominion of Canada

September 4, 1928

44,443 Series of recurring figures on either side of a grooved rib, each of said figures comprising an ellipse having its major axis at an angle to said groove, and being connected by an arm with an arcuate projection from said rib—pneumatic tire. Canadian Goodrich Co., Ltd., Kitchener, Ont.

44,444 Representation of a rib with three channels and on either side of said rib are recurring curvilinear projections in the form of an ellipse with its major axis at an angle to said grooves and connected with said rib by a neck portion—pneumatic tire. Canadian Goodrich Co., Ltd., Kitchener, Ont.

44,445 Combination of figures representing three strips having between the center and outer strips row of elliptical figures, while the outer strips have at their outer edges each a row of semi-globular figures—pneumatic tire. Canadian Goodrich Co., Ltd., Kitchener, Ont.

United Kingdom

August 8, 1928

486,102 FAIRYLITE—ball. S. Erhard & Son, 8 Bradford Ave., London, E. C. 1.

492,023 TOTONITE—rubber and gutta percha goods. Asbest-und Gummiwerke Alfred Calmon Aktiengesellschaft, 24, Dorotheenstrasse, Hamburg 39, Germany.

492,549 REMO—tires and inner tubes. Remo Tyres, Ltd., 310 Regent St., London, W. 1.

492,585 RELIANCE—games. Reliance Rubberware, Ltd., 212 Upper Thames St., London, E. C. 4.

August 15, 1928

B491,472 ARTIFEX—hair curlers and wavers. The Merkham Trading Co., Ltd., Bush House, Aldwych, London, W. C. 2.

492,394 ETHOWIRE—rubber covered electric wire. Burndept Wireless, Ltd., Aerial Works, Grotes Pl., Blackheath, London, S. E. 3.

August 22, 1928

490,825 Representation of an elephant's head, above the representation the word: "PRESTO," beneath the representation the words: "ELEPHIDE TRADE-MARK"—soles, tips and heels for boots and shoes, and rubber sheets for making such soles, tips and heels. Naamlooze Vennootschap Vereenigde Nederlandsche Rubberfabrieken, 162a, Dunslaan, Doorwerth, Holland.

492,125 GARPENDERS—garters and hose suspenders. M. I. Boucher, Carnderry Cottage, Victoria Square, Lee-on-Solent, Hampshire.

August 29, 1928

491,328 DOMILITE—boots, shoes and overshoes. Dominion Rubber Co., Ltd., 420, Lagauchetiere St. W., Montreal, Quebec, Canada.

491,500 Hexagon containing the representation of a woman's face and the words: "TRADE MARK"; beneath the representation the words: BEAUTÉ LIMITED"—goods made from rubber and gutta percha. Beauté, Ltd., 38, Old Bond St., London, W. 1.

492,486 Representation of a man walking—plates or pads for attachment to soles and heels of boots and shoes. Phillips' Patents, Ltd., 142 Old St., London, E. C. 1.

Designs

United States

76,168 OVERSHOE. Term 14 years. K. L. Valentine and George Ramsay, Jersey City, N. J.

76,195 TIRE CASING.. Term 14 years. Frederick Leopold, Jr., Harmonville, assignor to Lee Rubber & Tire Corp., Conshohocken, both in Pa.

76,201 SHOE HEEL. Term 14 years. L. M. Oakley, Trenton, N. J.

76,218 OVERSHOE. Term 7 years. E. S. Bott and A. S. Funk, La Crosse, Wis.

76,240 NONSKID MAT FOR PNEUMATIC TIRES. Term 14 years. F. O. Heltzel, Youngstown, O.

Dominion of Canada

8,030 GOLF BALL. Harlequin Ball & Sports Co., Ltd., Windmill Rd., Brantford, Middlesex County, England.

8,036, 8,037, 8,038, 8,039, 8,040 and 8,041 TIRE. Dominion Rubber Co., Ltd., Montreal, Que.

Labels

United States

34,505 ACROBATIC CLOWNS. Type characters. The Superior Type Co., Chicago, Ill. Published March 27, 1928.

34,506 MAMMOTH CIRCUS. Type characters. The Superior Type Co., Chicago, Ill. Published March 27, 1928.

34,507 MIDGET CIRCUS. Type characters. The Superior Type Co., Chicago, Ill. Published March 27, 1928.

34,508 TRAINED ANIMALS. Type characters. The Superior Type Co., Chicago, Ill. Published March 27, 1928.

Tire Pop Valve

A new invention to get exactly the proper air pressure in tires while inflating them has been introduced by the Tire Pop-Valve Sales Co., 709 Pontiac Bank Bldg., Pontiac, Mich. The valve is designed to be sold in sets of four

Pop-Valve

and screw on to the valve stems without disturbing the core valve, and, it is claimed, will remain in good condition for the life of the tire. When the tire needs inflating, the air hose is applied as usual, the pop valve signaling when the designated pressure is reached, after which no more air can pass into the tire. This device makes it easy to accurately inflate tires either in daylight or darkness, and without a gage.

Clean Factory Floors

A sweeping compound for linoleum, concrete and cement floors, manufactured by The Massillon Sweeping Compound Co., Massillon, O., is made from a special grade of sawdust and soft sand which will not injure any floor. A consistent use of the Superior preparation, the manufacturer claims, will soon brighten the dullest floor, keep the dust down and make the floor look as if it were scrubbed daily.

Legal

Patent Suits

CLOSET SEAT. No. 1,273,703, Brunswick-Balke-Collender Co., Equity No. 1917, District Court for the District of Connecticut. Brunswick-Balke-Collender Co. v. The Seamless Rubber Co. Opinion by J. Thomas. The single claim for closet seats was held valid but not infringed, it being found that the claim had been limited during prosecution in the Patent Office to a construction of thoroughly dried layers of wood veneer with the layers disposed angularly, the core having a rough pubescent surface, and a covering of hard rubber vulcanized on said core. Therefore it was found the patent to be valid and the claim narrow in scope and that the defendant does not infringe.

WELL CASING PROTECTOR. No. 1,573,031. Bettis & Perry, well-casing protector, filed May 4, 1928, D. C., S. D. Calif. (Los Angeles), Doc. E. N.—87—M. W. I. Bettis et al. v. Eno Rubber Corp. of Calif. *Official Gazette*, Vol. 373, p. 277.

CAOUTCHOUC SUBSTANCE. No. 1,149,580, Hofmann & Gottlob, new caoutchouc substance and vulcanization product thereof, C. C. A., 2 Cir., Doc. 9,888. The Grasselli Chemical Co. v. National Aniline & Chemical Co., Inc. Affirmed (notice dated June 26, 1928.) *Official Gazette*, Vol. 373, p. 537.

PATCHES. No. 1,068,691, J. G. Moomy, Patches for rubber articles, C. C. A., 7th Cir., Doc. 3979, J. G. Moomy v. G. & J. Tire Co. et al. Affirmed June 5, 1928. *Official Gazette*, Vol. 373, p. 761.

Treasury Decisions

BALLS. No. 6529. Protest 31712—G of Bullocks (Los Angeles). Balls—Toys. Balls classified as toys at 70 per cent ad valorem under paragraph 1414, tariff act of 1922, are claimed dutiable at 30 per cent under paragraph 1402. Opinion by J. Tilson. On the authority of United States v. Stewart (12 Ct. Cust. Appls. 533; T. D. 40734) the balls in question were held dutiable under paragraph 1402 as balls used for playing or exercise. *Treasury Decisions*, Vol. 54, p. 11.

GARTERS. No. 6536. Protest 209855—G of A. Steinhardt & Bros. (New York). Silk Garters. Silk garters classified at 60 per cent ad valorem under paragraph 1211, tariff act of 1922, are claimed dutiable at 55 per cent under paragraph 1207. Opinion by J. Tilson. In accordance with the amended report of the appraiser fancy elastic garters composed in chief value of silk were held dutiable at 55 per cent under paragraph 1207 as claimed. *Treasury Decisions*, Vol. 54, p. 13.

Tire and Tube Consumption—1926-27

Each motorist last year purchased an average of 2.8 pneumatic casings for his automobile, compared with 2.6 casings purchased by each motorist in 1926, according to the American Motorists' Association's analysis of census figures for the two years. A total of 64,059,220 pneumatic casings were purchased in 1927 by motorists compared with 59,004,343 purchased in 1926. In round numbers thirty million were high pressure and thirty-four million were balloon casings. An average of 3.1 inner tubes per automobile were required in 1927, or a total of 73,000,000 tubes.

New Dental Impression Gum

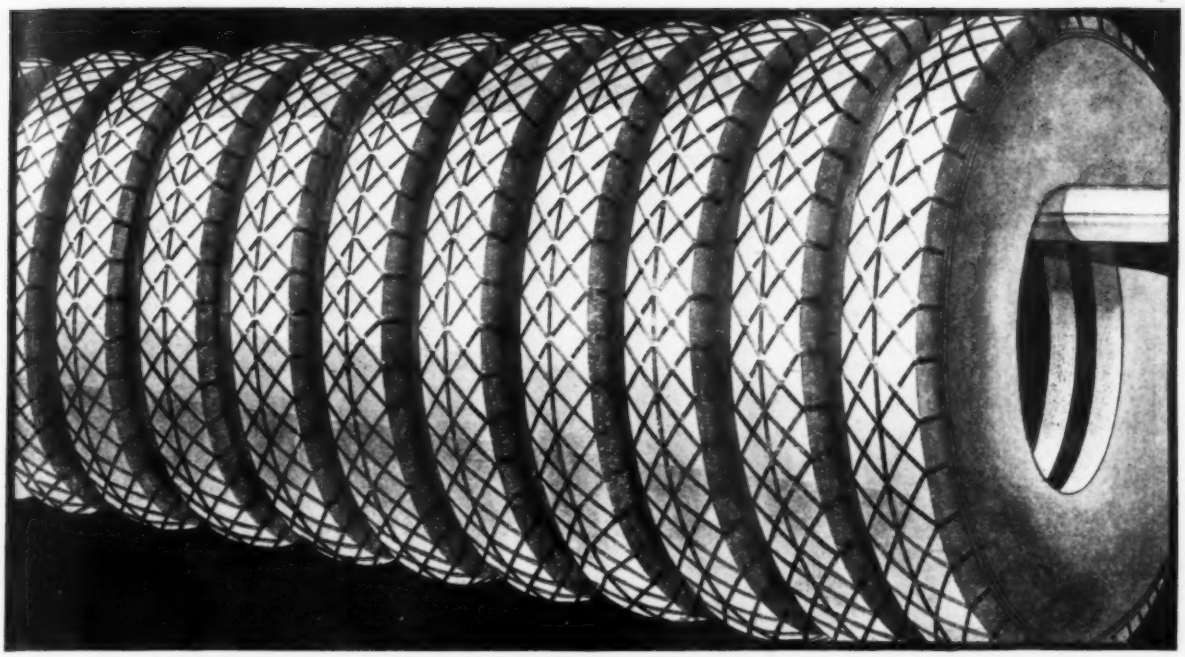
In a new gum for making dental impressions effective use is said to be made of rubber finely dispersed in a reversible hydrocolloid obtained from mucilaginous vegetable matter such as "haithao" or "dschin-dschen" and substances such as resins, fats, fibers, etc. Alphons Poller, United States patent No. 1,672,776, June 5, 1928.

Rims Approved by Tire & Rim Association

Rim Size	August, 1928 Number	August, 1928 Per Cent	8 Months, 1928 Number	8 Months, 1928 Per Cent
Motorcycle				
24 x 3	2,959	0.1	25,521	0.2
26 x 3	4,220	0.2	35,616	0.2
28 x 3	.....	...	753	0.0
Clinchers				
30 x 3½	96,426	4.1	435,360	2.5
31 x 4	.....	...	3,292	0.0
18" Balloons				
18 x 3½	.....	...	9,362	0.1
18 x 4	132,681	5.7	933,499	5.3
18 x 3.25	26,517	1.1	79,520	0.5
18 x 4½	17,296	0.7	103,227	0.6
18 x 5	684	0.0	4,461	0.0
19" Balloons				
19 x 2.75	54,487	2.5	71,920	0.4
19 x 3½	112,274	4.8	1,386,668	7.9
19 x 4	340,878	14.7	1,795,266	10.3
19 x 3.25	3,045	0.1	8,664	0.0
19 x 4½	91,563	4.0	719,103	4.1
19 x 5	8,886	0.4	30,157	0.2
20" Balloons				
20 x 2.75	44,241	1.9	149,268	0.9
20 x 3½	17,704	0.8	372,739	2.1
20 x 4	341,587	14.8	2,594,815	14.8
20 x 4½	81,088	3.5	365,427	2.1
20 x 5	64,569	2.8	562,737	3.2
20 x 6	6,954	0.3	79,174	0.5
21" Balloons				
21 x 2.75	423,840	18.3	4,245,146	24.2
21 x 3½	52,832	2.3	602,691	3.4
21 x 4	28,847	1.2	460,222	2.6
21 x 4½	6,433	0.3	260,465	1.5
21 x 5	.....	...	7,240	0.0
21 x 6	.....	...	4,233	0.0
22" Balloons				
22 x 3½	.....	...	1,775	0.0
22 x 4	1,035	0.0	3,197	0.0
22 x 4½	990	0.0	2,440	0.0
High Pressure				
30 x 3½-23	12,658	0.5	47,576	0.3
31 x 4-23	.....	...	640	0.0
32 x 4½-23	9,329	0.4	59,558	0.3
32 x 4-24	6,932	0.3	58,577	0.3
33 x 4½-24	1,910	0.1	2,316	0.0
32 x 3½-25	50	0.0	50	0.0
33 x 4-25	.....	...	2,198	0.0
34 x 4½-25	817	0.0	5,949	0.0
20" Truck				
30 x 5	239,334	10.3	1,374,170	7.8
32 x 6	49,726	2.1	314,804	1.8
34 x 7	16,255	0.7	90,239	0.5
36 x 8	7,809	0.3	51,768	0.3
40 x 10	314	0.0	4,241	0.0
22" Truck				
36 x 7	.....	...	8,987	0.0
38 x 8	.....	...	200	0.0
24" Truck				
34 x 5	.....	...	14,487	0.1
36 x 6	2,192	0.1	33,658	0.2
38 x 7	4,279	0.2	41,278	0.2
40 x 8	2,211	0.1	23,838	0.1
44 x 10	.....	...	796	0.0
Airplane				
8 x 3 SS	21	0.0	42	0.0
12 x 3 SS	52	0.0	73	0.0
18 x 3 SS	366	0.0	458	0.0
20 x 3 SS	.....	...	6	0.0
20 x 3½ SS	143	0.0	1,552	0.0
20 x 4 SS	162	0.0	748	0.0
21 x 4 SS	.....	...	21	0.0
20 x 5 SS	8	0.0	76	0.0
20 x 6 SS	.....	...	2,291	0.0
24 x 10 SS	.....	...	53	0.0
18 x 4 Cl	2,294	0.1	8,961	0.1
Totals	2,318,898	...	17,503,529	...

Cut in Dipped Goods Curing Time

If time be money, Dr. Rudolf Ditmar and Gustav Balog of Germany have seemingly made a princely present to dipped rubber goods makers. They have discovered that the time spent in sulphur chloride vapor vulcanizing has been nearly all wasted. Instead of using from 40 to 45 minutes in curing, as so long customary, they have produced excellent vulcanizates in 2, 4, 5, and 15 minute exposures of films. They have found, too, that the process proceeds in cycles or has points of reversion, as between the figures stated overcuring occurs; but beyond 30 minutes curing proceeds without faltering or regression. The plain inference is that dipped goods have been getting at least 30 minutes' unnecessary vulcanizing. Well, if such a delusion has has been hugged too long, there is nothing to deter dippers now from making up for lost time by radically revising shop practice and speeding up production schedules.



UNIFORMITY

IT takes more than good intentions to attain uniformity of liquid or resinous condensation products, not only in their accelerating strength, but in *all* their physical properties. Knowledge, experience and scientifically exact equipment are required to achieve the chemical control necessary to produce this uniformity.

It is because du Pont has these resources and uses them that a large proportion of rubber manufacturers prefer du Pont as a source of supply, especially for accelerators, the uniformity of which can be controlled only by vulcanization tests.

Ask the du Pont representative what is responsible for the unparalleled uniformity of Vulcanol, of Vulcone and of Vulcanex. He will be glad to tell you!

• • •

For molded tubes—Vulcanol is the premier accelerator not only because of its uniformity and freedom from discoloring impurities but also on account of its long curing range, pronounced antioxidant effect and unequalled low cost. Many tire manufacturers who are jealous of their reputation for quality use it in carcass stocks also.

E. I. DU PONT DE NEMOURS & CO., Inc.

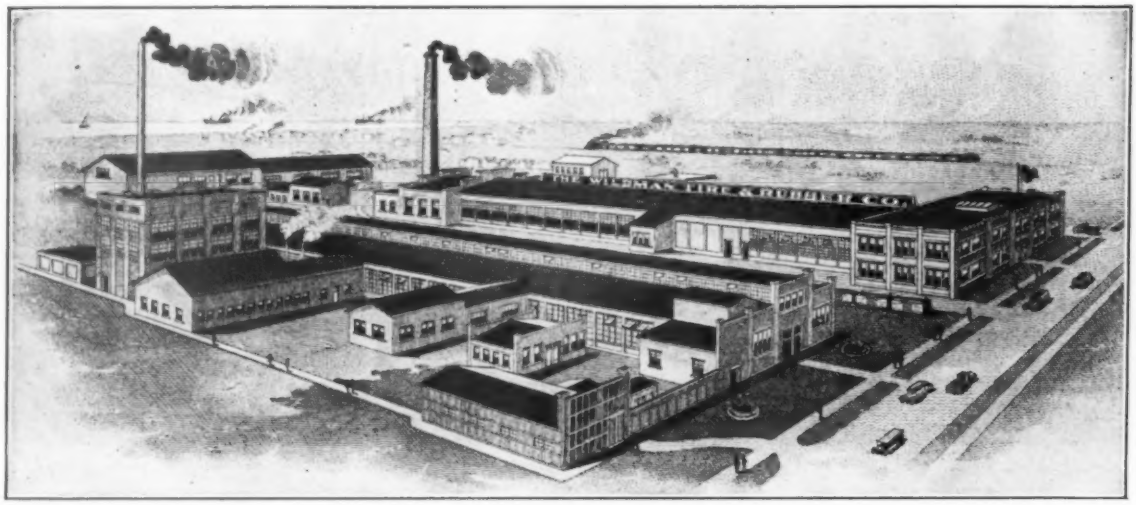
Dyestuffs Department, Sales Division

WILMINGTON, DELAWARE

Fine Rubber DU PONT REG. U. S. PAT. OFF. ***Chemicals***

U. S. Court Receiver's Sale

This Tire Plant Can be Bought
At Fraction of Replacement Value



Wildman Tire & Rubber Co., Plant—Port Clinton, Ohio

COMPLETE FACTORY IN HIGH CLASS CONDITION READY FOR TIRE AND TUBE MANUFACTURING

Land, Buildings and Machinery to be sold as a whole or in parcels.

This Plant Is a REAL Bargain.
There is no better distributing point.
Ample electric current is available.
Labor conditions are good and all American.

LOCATION

Located at Port Clinton, O., on the New York Central Railroad line. Port Clinton is on the Electric Road 41 miles east of Toledo; is 12 miles from Sandusky, 72 miles from Cleveland. Paved highways in all directions.

REAL ESTATE

The property includes about 17 acres of land with a reservation for a pipe line to Lake Erie. Fine shipping facilities direct from the factory.
Part of the land is suitable for allotment.

BUILDINGS

Six one-story well-built Brick Buildings, having a combined floor space of 55,834 square feet, constitute the main part of the plant in which there are excellent office arrangements.
Excellent power plant in separate building is sufficient for several times the present capacity requirements.
Five modern one-story frame buildings; combined floor space, 6053 square feet.

CAPACITY

Present capacity is 1,000 tires and 400 tubes. 3,500 tires could be produced daily with only slight additions to present equipment.

MACHINERY

Machinery in good condition. This includes a 66" calender, Six 60" mills, Six vulcanizers, a well-equipped machine shop, and all other necessary machinery.

Offered on the premises, at 10:30 a. m. each Saturday until sold; but at any time bids will be received on the property as an entirety, and on separate parcels of real estate or machinery and equipment. Terms: Not less than One Third cash and the balance in payments extending over not more than Thirty Months.

If interested in buying this plant communicate either with the Receiver or with his Attorney.

JESSE P. DICE
Attorney for Receiver
722 Second National Bldg.
Akron, Ohio

RUSSELL B. KOONTZ, Receiver
730 Carroll Street
Akron, Ohio

MARKET REVIEWS

CRUDE RUBBER

New York Exchange

TRANSACTIONS on the Rubber Exchange from August 27 to September 22 inclusive were 7,842 lots, equivalent to 19,605 tons, comparing with 22,645 tons done from July 23 to August 25 inclusive. This decline apparently reflects the confidence of consumers that ample stocks of rubber will be forthcoming and the belief that prices will therefore probably not materially increase this fall.

Summarized by weekly intervals beginning with the week closed September 1 the course of the market was as follows: Nothing of particular interest occurred to stimulate trading either on or off the Rubber Exchange. The membership in general, anticipating the labor day holidays, did not urge business as strenuously as usual. London stocks at the close of the week had increased 224 tons.

It is of interest to note that cable advices from Malaya estimate that about 65,000 tons of rubber will be available for export on November 1, 1928. This tonnage is less than was generally anticipated.

Prices for the week were largely nominal with very minor spreads between high and low prices. Spot closed at 18.50 cents, November at 18.70 cents bid, March at 18.70 cents, and May and June at 19.00 cents offered. Factory interests continued to stand off for lower levels but there was little desire to sell at less than figures 10 to 20 points over bids.

Trading in the week ended September 8 was as quiet as the week before. September liquidation was in progress and had a depressing influence against the market. It was also notable that large operators who, up to a few weeks ago, steadily exerted severe pressure against the market, had become consistent buyers.

Trading in the new contract representing blanket and brown grades opened on Monday but very little business passed on this contract largely due to the scarcity of nearby as indicated by the bid price for September BB, which was above the same delivery for the standard contract.

Prices for the week closed from 50 to 80 points below those of the previous week for corresponding grades. A contracts for September closed at 18.00 cents, December at 18.10 cents, January at 18.00 cents bid, March at 18.10, May at 18.20 to 18.40 cents and July at 18.30 to 18.40 cents. BB contracts closed nominal as follows: September 18.30 cents bid, December 17.50 cents nominal, January 17.20 cents nominal, March and May 17.10 cents nominal and July 17.00 cents bid.

Trading during the week ended September 15 developed more activity. Prices became firmer when statistics for August were published. Profit taking and general hesitancy to buy caused some reaction later in the price which closed steady at the following figures: A contracts, September 18.10 cents, December 18.30 cents, January 18.20 to 18.30 cents, March 18.30 to 18.40 cents, May 18.50 cents, July 18.40 to 18.50 cents. BB contracts, September 18.00 cents, December 17.50 cents, January, March and May 17.10 cents, July 17.30 to 17.60 cents.

The week terminated September 22 brought little of interest or activity but the prices were well supported. The chief interest centered in the third census of rubber stocks in Malaya which were reported as follows:

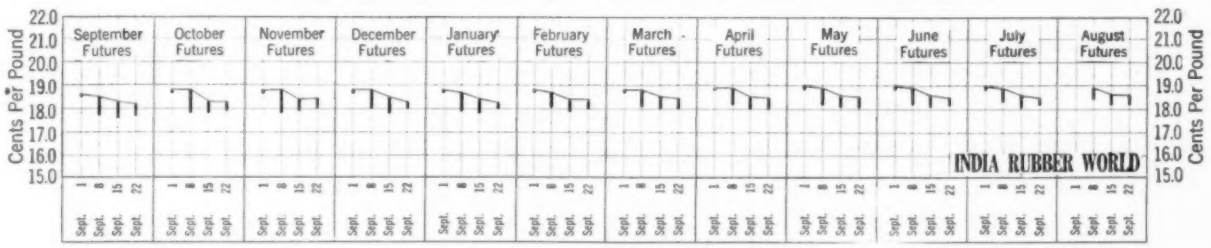
	June 30, 1928 Tons	July 31, 1928 Tons	August 31, 1928 Tons
Estates of 100 Acres and Over	44,791	53,666	52,905
In dealers' hands	13,536	9,055	12,147
Total	58,327	62,721	65,052

These figures show an increase in the total of 2,331 tons during August.

Closing prices ran slightly below those of the previous week. September 17.70 to 17.80 cents, December, January and March 18.00 to 18.10 cents, May 18.10 to 18.30 cents and July 18.20 to 18.30 cents. BB contracts were all nominal, September 17.90 cents, December 17.50 cents, January 17.40 cents, March and May 17.30 cents, July 17.20 to 17.30 cents.

H. Heintz & Co. in its market letter of September 14 expressed the belief regarding rubber, "That long positions in

New York Rubber Exchange—High and Low Monthly Futures



The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLOSING PRICES—CENTS PER POUND

Positions 1928	August 27	28	29	30	31	1*	3*	September 4	5	6	7	8	10	11	12	13	14	15	17	18	19	20	21	22
September	18.5	18.5	18.6	18.6	18.5	....	....	18.5	18.3	18.2	18.0	17.7	17.6	17.8	18.3	18.2	18.1	18.1	18.2	18.2	18.1	18.0	17.7	17.7
October	18.7	18.7	18.7	18.8	18.7	....	....	18.8	18.5	18.4	18.1	17.8	17.8	18.0	18.4	18.3	18.2	18.2	18.2	18.3	18.2	18.0	17.9	17.9
November	18.7	18.7	18.7	18.8	18.7	....	....	18.8	18.6	18.4	18.1	17.8	17.9	18.0	18.4	18.3	18.2	18.2	18.2	18.4	18.2	18.0	18.0	18.0
December	18.8	18.7	18.8	18.8	18.8	....	....	18.8	18.5	18.5	18.1	18.0	17.8	18.0	18.5	18.4	18.3	18.3	18.3	18.4	18.2	18.1	18.0	18.0
1929																								
January	18.8	18.7	18.7	18.7	18.7	....	....	18.7	18.5	18.3	18.0	17.9	17.8	18.0	18.4	18.3	18.2	18.2	18.2	18.3	18.2	18.1	18.0	18.0
February	18.8	18.8	18.8	18.8	18.7	....	....	18.7	18.5	18.4	18.1	17.9	17.9	18.1	18.4	18.3	18.3	18.2	18.3	18.4	18.2	18.1	18.0	18.0
March	18.8	18.8	18.8	18.8	18.7	....	....	18.8	18.5	18.4	18.1	17.9	18.0	18.1	18.5	18.4	18.3	18.3	18.3	18.5	18.2	18.1	18.0	18.0
April	18.9	18.8	18.9	18.9	18.8	....	....	18.9	18.6	18.5	18.2	18.0	18.0	18.2	18.5	18.5	18.3	18.3	18.3	18.5	18.3	18.2	18.0	18.0
May	19.0	18.8	19.0	19.0	19.0	....	....	18.9	18.8	18.6	18.2	18.1	18.1	18.3	18.6	18.6	18.5	18.3	18.3	18.5	18.4	18.3	18.1	18.1
June	19.0	18.8	19.0	19.0	19.0	....	....	18.9	18.7	18.6	18.2	18.1	18.1	18.3	18.6	18.6	18.5	18.4	18.3	18.5	18.4	18.3	18.2	18.2
July	19.0	18.8	19.0	19.0	19.0	....	....	18.9	18.7	18.6	18.3	18.2	18.1	18.3	18.6	18.6	18.4	18.4	18.4	18.5	18.4	18.3	18.2	18.2
August	....	....	....	....	....	....	....	18.9	18.8	18.6	18.4	18.2	18.2	18.3	18.6	18.6	18.5	18.4	18.4	18.6	18.4	18.4	18.2	18.2

*Holiday.

the commodity around the present levels will eventually prove profitable." Under date of September 20 this firm said:

"There is nothing in view to influence the market materially either way for the time being, but we continue of the opinion that the far forward positions should be purchased around current levels, or on a scale down if any further easing of prices occurs."

In regard to trading in a second contract, covering six additional grades of rubber, F. R. Henderson Corp., New York remarks:

It is expected that the addition of the new grades will bring a large increase in the volume of business on the exchange. With both contracts in force the grades tenderable on the exchange give a range covering more than 90 per cent of all the rubber used by American manufacturers and include everything except the very lowest grades.

The "BB" contract covers the following grades: A, B, C and D blanket crepes and No. 1 and No. 2 brown crepes. The first two grades are deliverable at contract price and the other four at differentials which are fixed monthly by the Adjustment Committee.

New York Outside Market

For the past month manufacturers have not been keenly interested in buying rubber. They evidently are satisfied that present price levels can be counted upon to remain steady for a reasonable length of time. They have discounted the end of restriction on November 1 and are concerned now to keep inventories down pending the approach of January 1, while buying steadily for nearby delivery.

The general features of the outside market by weekly periods were as follows:

The market for the week closed September 1 proved extremely dull with practically no fluctuations up or down. Nearby rubber continued to hold very steady and tightness characterized the position of roll brown, blanket crepes and off grades. Roll brown was almost unobtainable except such as was held to fill contracts. Crepe was steady at a slight premium over ribs. On Thursday and Friday the market was absolutely flat due to the proximity of the approaching three day closing on account of Labor Day.

Spot ribs "B" blanket and No. 1 brown all closed for the week at 18¾ cents buyers, 19 cents sellers. Crepe at 19¼ cents buyers and sellers. No. 1 roll brown 18⅝ cents buyers, 18¾ cents sellers. Paras were very quiet. Upriver grade closed at 20½ cents buyers, 21 cents sellers.

The week terminated September 8 business continued very dull with prices gradually sagging due to the policy of holding back practiced by consumers who apparently believe that by remaining out of the market they will secure lower prices. This attitude prevails toward all grades but the scarcity of the softer sorts holds them at parity with ribs. London stocks decreased to a tonnage about equal to a month's supply.

Spot closing prices for the week were, first latex 18⅞ cents buyers, 19 cents sellers; ribs 18¼ cents buyers, 18⅜ cents sellers; "B" blanket and No. 1 brown grades 18⅝ cents buyers, 18¾ cents sellers, No. 1 roll brown 18¼ cents buyers, 18½ cents sellers.

Paras were very quiet and lower in sympathy with plantations. Upriver fine closed at 20½ cents buyers, 21 cents sellers. Balatas were unchanged and very quiet.

Market conditions of the week closed September 15 showed more strength and prices stiffened about ½ to ¾ cent for the standard grades. Good factory buying was reported at the beginning of the week. London and Singapore prices stiffened and holders were less inclined to sell. Publication of August consumption report acted to firm the market which was strongly held. Current prices were expected to hold their level until November 1 when restriction ceases when the future trend of the market will become evident.

Spot closing prices for the week were, first latex 18¾ cents buyers, 19 cents sellers; ribs 18¼ cents buyers, 18⅜ cents sellers. "B" blanket and No. 1 brown 17¾ cents buyers, 18 cents sellers, No. 1 roll brown 17⅝ cents buyers, 17¾ cents sellers.

Paras were quoted lower but actual holders in Brazil are not inclined to sell at prevailing prices. Upriver fine closed at 19¼ cents buyers, 19½ cents sellers. Balatas were very quiet, little inquiry but supplies available.

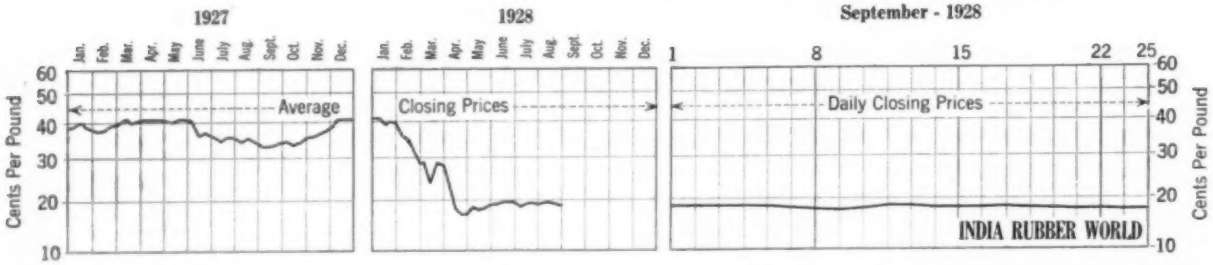
A fair amount of factory buying featured the market for the week ended September 22. This was done, however, at their own figures. The market generally was depressed. First latex was scarce as also were ambers, No. 1 brown and roll brown. The soft grades are entering the market in steadily decreasing quantity. The so-called Pool seemed to be supporting prices but no special advances occurred.

Spot closing prices for the week were: First latex 18⅞ cents buyers, 19 cents sellers; Ribs 17¾ cents buyers, 18 cents sellers; "B" blanket and No. 1 brown 18 cents buyers, 18¼ cents sellers; No. 1 roll brown 17¼ cents buyers, 17½ cents sellers. Paras were dull and neglected with the primary markets disinclined to sell. Upriver fine closed at 18¾ cents buyers, 19 cents sellers. Balatas were steadier and in small demand.

On September 25 spot ribs were 18 cents buyers, 18¼ cents sellers compared with 18¾ cents buyers, 19 cents sellers on September 3.

Importations of all grades in August were 29,805 tons, compared with 33,068 tons one year ago. Plantation arrivals for August were 28,675 tons, compared with 31,195 tons one year ago. Total importations of plantation rubber for seven months ended August 30 were 262,700 tons

New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets



New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

	August, 1928					September, 1928																
PLANTATIONS	27	28	29	30	31	1*	3*	4	5	6	7	8	10	11	12	13	14	15	17	18	19	20	21	22
Sheet																								
Ribbed smoked	18¾	18¾	18¾	18⅞	18¾	....	....	18¾	18⅝	18⅜	18⅛	17⅞	17¾	18	18⅛	18⅜	18¼	18⅛	18¼	18⅜	18⅛	18	17¾	17⅞
Crepe																								
First latex	19¼	19¼	19⅜	19½	19½	....	....	19⅜	19¼	19¼	18¾	18½	18½	18⅝	19⅛	19⅛	19	19	18¾	19⅛	19	18¾	18⅝	18¼
No. 2 blanket	19	18¾	18⅞	18⅞	18⅞	....	....	18⅞	18⅞	18⅝	18⅜	18⅛	18⅛	18⅛	18⅜	18½	18⅜	18⅜	18⅜	18½	18⅜	18⅛	17⅞	17⅞
No. 3 blanket	18⅞	18½	18⅝	18⅝	18¾	....	....	18⅝	18⅝	18⅛	18⅛	17⅞	17⅞	17⅞	18⅛	18⅛	18⅛	18⅛	18⅛	18¼	18⅛	17⅞	17⅝	17⅝
No. 4 blanket	18⅛	18⅛	18⅛	18⅛	18½	....	....	18½	18⅜	18⅛	17⅞	17⅝	17⅝	17⅞	18⅛	18⅛	17⅞	17⅞	17⅞	18	17⅞	17⅝	17⅜	17½
Thin clean brown	18⅞	18⅝	18⅝	18⅝	18¾	....	....	18¾	18⅝	18⅛	18⅛	17⅞	17⅞	17⅞	18⅛	18⅜	18¼	18⅛	18⅛	18¼	18⅛	17⅞	17¾	17⅝
Rolled brown	18¾	18¾	18⅝	18½	18⅝	....	....	18¾	18½	18¼	18	17¾	17⅝	17¾	18⅛	18	17¾	17¾	17¾	17⅞	17⅞	17¾	17⅝	17⅝
Off latex	19	19	19⅛	19¼	19⅛	....	....	19	19	18⅞	18½	18¼	18¾	18¾	19	18¾	18¾	18¾	18½	18¾	18¾	18½	18¼	18½

*Holiday.

compared with 280,363 tons for the corresponding period of 1927. Total importations of all grades of rubber for seven months ended August 30 were 275,684 tons, compared with 298,585 tons for the corresponding period of 1927.

RUBBER AFLOAT TO THE UNITED STATES
(All figures in long tons)

Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	Total
Sept. 1..	5,501	979	1,238	835	8,553
Sept. 8..	5,105	226	2,254	295	7,880
Sept. 15..	5,086	1,562	1,342	734	8,724
Sept. 22..	5,553	709	1,892	505	8,659

London

During September the market ruled quiet, and declining on the whole. The advances made from time to time were easily lost. On September 4 spot ribs closed at 8⅞ pence and on September 24 at 8½ pence.

An easy tendency prevailed during the week ended September 1 principally owing to liquidation of September position on speculative account. European manufacturers were more interested in the market than American. Ribs at the end of the week were 8½ pence, ⅜ pence down from the beginning.

The market for the week ended September 8 continued dull with sagging prices due to lack of buying interest. The decline for the week on spot ribs was ⅜ pence, closing at 8⅛ pence.

The week closed September 15 showed practically no change except a decline of ¼ pence. Spot ribs closed at 8⅛ pence, ⅛ pence down for the week.

The weekly record of London stocks since August 25 is as follows: September 1, 31,933 tons; September 8, 31,477 tons; September 15, 32,100 tons; September 22, 31,884 tons.

Singapore

The Singapore market as usual was closely controlled by western manufacturing demand and generally steady and dull. The plantation rubber industry is outlined by the *Malayan Tin & Rubber Journal*, July 15, 1928, in the following terms:

The generally acepted idea is that we are in for two or three very lean years in the rubber industry. This means that the industry will have to work on lower levels in respect of production costs and create a much higher level in capacity and efficiency. In short, the war with the Dutch is already well under way and some of the consequences of the abnormally low price for rubber during the past three months are already becoming apparent. On the British side, European managed companies, besides providing for the immediate future by withholding from their shareholders all profits made last year, and contracting for the forward sale of surplus rubber for a year hence at current rates, are drastically pruning down estate costs. We are already hearing of tapping costs steadily coming down from month to month since April and in one instance at least 25 per cent has been knocked off the actual cost of production. Where all-in costs have ranged from anything between 20 and 44 cents (Straits currency) per pound we very much doubt if today there are more than a half dozen European managed concerns that have not succeeded in bringing this cost down to the region of 30 cents.

New York Quotations

Following are the New York open market rubber quotations for one year ago, one month ago and September 25, the current date

	September, 26, 1927	August, 25, 1928	September, 25, 1928
Plantation Hevea			
Rubber latex (Hevea)...gal.	$1.50 @	$1.40 @	$1.40 @
CREPE			
First latex spot	.34 @	.19⅜ @	.19 @.19¼
September	.34 @	.19⅜ @	.19 @.19¼
October-December	.34½ @	.19⅜ @	.19¼ @
January-March	.34½ @.34¾	.19⅜ @	.18¾ @.19
April-June	.35 @	.19⅜ @	.18½ @
Off latex, spot	.33½ @.33½	.19¼ @	.19 @
"B" Blanket, spot	.28½ @.29	.19½ @	.18 @.18¼
September	.29 @	.18⅞ @	.18 @
October-December	.29¼ @	.18⅝ @	.18 @
January-March	.29¾ @	.18½ @	.17¾ @
April-June	.30½ @	.18⅜ @	.17⅝ @
"C" Blanket, spot	.28 @.28½	.19¼ @	.17¾ @.18
Brown No. 1	.28¼ @.28½	.18¾ @	.17½ @
Brown No. 2	.28 @	.18½ @	.17¼ @
Brown, roll	.25 @	.18¼ @	.17 @
Sheet			
Ribbed, smoked spot	.33¾ @.34	.19 @	.18 @.18⅛
September	.33¾ @.34	.19 @	.18⅛ @
October-December	.34¼ @	.19 @	.18⅛ @
January-March	.34½ @.34¾	.19 @	.18¼ @.18⅜
April June	.35½ @	.19 @	.18¼ @.18⅜
East Indian			
PONTIANAK			
Banjermasin	.09 @	.09½ @	.10 @
Pressed block	.14 @	.15½ @	.15 @
Sarawak	@	.09½ @	.09¼ @
South American			
PARAS			
Upriver, fine	.27¾ @	.21 @	.19 @
Upriver, fine	*.37½ @	*.25½ @	*.24 @
Upriver, coarse	.20 @	.15 @	.13½ @
Upriver, coarse	*.29 @	*.22 @	*.19¾ @
Islands, fine	.24½ @	@	@
Islands, fine	*.37 @	*.25½ @	*.23½ @
Acre, Bolivian, fine	.28 @	.22 @	.19½ @
Acre, Bolivian, fine	*.38 @	*.26 @	*.24 @
Beni, Bolivian	.28½ @	.22¼ @	.20 @
Madeira, fine	.27¾ @	.22 @	.19¼ @

	September, 26, 1927	August, 25, 1928	September, 25, 1928
South American			
PARAS—*Continued*			
Peruvian, fine	@	$0.21 @	$0.18¼ @
Tapajos, fine	@	.20½ @	.18¼ @
CAUCHO			
Upper caucho ball	.20¾ @	.13¼ @	.12½ @
Upper caucho ball	*.29 @	*.22 @	*.19¾ @
Lower caucho ball	.19¼ @	.12¾ @	.12 @
Maniçobas			
Ceará negro heads	.22 @	@	†.17 @
Ceará scrap	.12 @	@	†.09 @
Manicoba, 30% guaranteed	.22 @	@	†.19 @
Mangabiera, thin sheet	.22 @	@	†.19 @
Centrals			
Central scrap	.19½ @	.14¼ @	.14½ @
Central wet sheet	.15 @	.10 @	.12 @
Corinto scrap	.19½ @	.14¼ @	.14½ @
Esmeralda sausage	.19½ @	.14¼ @	.14½ @
Guayule			
Duro, washed and dried	@	.19 @	.18½ @
Ampar	.28½ @	.20½ @	.19¼ @
Gutta Percha			
Gutta Siak	.21 @	.18½ @	.19 @
Gutta Soh	@	.30 @	.30 @
Gutta Macassar	3.50 @	2.90 @	3.00 @
Balata			
Block, Ciudad Bolivar	.40 @	.41 @	.43 @
Colombia	.41 @	.42 @	.48 @
Manaos block	.44 @	@	.44 @
Panamá	.41 @	@	.48 @
Surinam sheet	.57 @	.50 @	.46 @
Amber	.61 @	.52 @	.49 @
Chicle			
Honduras	‡.65 @	‡.68 @	‡.68 @
Yucatan, fine	‡.65 @	‡.68 @	‡.68 @

*Washed and dried crepe. Shipment from Brazil.
†Nominal. ‡Duty paid.

Low and High New York Spot Prices

	September 1928*	September 1927	September 1926
PLANTATIONS			
First latex crepe	$0.18½ @ $0.19¾	$0.33 @ $0.34¾	$0.40¼ @ $0.43½
Smoked sheet, ribbed	.17¾ @ .19	.33 @ .34½	.40 @ .43
PARAS			
Upriver, fine	.18¾ @ .21	.28¾ @ .30	.38 @ .40
Upriver, coarse	.13½ @ .14	.19 @ .20	.26½ @ .30
Islands, fine	.17½ @ .19	.26 @ .26¾	.35¾ @ .37½

*Figured to September 25, 1928.

Plantation Rubber Exports from Malaya*

January 1 to June 30, 1928

	From Singapore Tons	From Penang Tons	From Malacca Tons
To United Kingdom	2,616.69	3,218.91	2,656.30
British Possessions	1,741.77	155.00	95.00
Continent of Europe	4,851.80	702.67	1,413.11
United States	70,149.35	12,454.49	3,830.09
Janan	8,067.00	1,092.50	1,141.00
Other countries	129.83	.....	.....
Totals	87,556.44	17,623.57	9,135.50

*Excluding all foreign transhipment.

Reclaimed Rubber

CONSUMPTION of reclaimed rubber during September was at a rate somewhat reduced from that of August, although totaling a heavy tonnage. Reclaiming plants are operating at full capacity and not infrequently on three eight-hour shifts daily. This is generally true of the tire reclaiming departments producing light gravity stocks of good tensile properties. The fact that crude rubber prices remain at low levels has not slacked the production of reclaim. In general the demand continues strong for whole tire reclaim, also for gray and red stocks.

Only slight changes are noted in the market quotations of one month ago as rubber scrap remains in wide demand and quite firm. Consumption of reclaim is particularly heavy in tires and tubes, heels, insulated wire, auto topping, etc. Solid tire reclaim rates high as an ingredient of stocks subject to abrasive wear in service.

Prices on all grades are below true value and reflect the keenly competitive conditions prevailing in the reclaim industry.

New York Quotations

September 25, 1928

High Tensile	Spec. Grav.	Price Per Pound
Super-reclaim, black	1.20	$0.13 @$0.13¼
red	1.20	.13¼ @ .13½
Auto Tire		
Black	1.21	$0.07½ @$0.07¾
Black selected tires	1.18	.08 @ .08¼
Dark gray	1.35	.09½ @ .09¾
Light gray	1.38	.12 @ .12½
White	1.40	.13 @ .13½
Shoe		
Unwashed	1.60	.07¼ @ .07½
Washed	1.50	.10 @ .10¼
Tube		
No. 1	1.00	.14½ @ .15
No. 2	1.10	.11 @ .11½
Miscellaneous		
Red	1.35	.13 @ .13¼
Truck tire, heavy gravity	1.55	.07 @ .07¼
Truck tire, light gravity	1.40	.07½ @ .07¾
Mechanical blends	1.60	.06¾ @ .07½

Rubber Scrap

THE September demand for rubber scrap was fair, the falling off from that of August being due to the low level prevailing for crude rubber. Tire collection is active and stocks of scrap are now increasing at warehousing points.

Boot and shoe scrap remains very inactive and without interest to reclaimers; therefore collections are light and stocks kept low by dealers. Shoe scrap prices remain unchanged from a month ago on all grades except black, which is quoted ⅛ cent lower.

The situation with scrap solid tires is only a little better than that of shoe scrap. Freight rates on solids are out of proportion to their rubber scrap value to such an extent that tires as a whole are not valued for their rubber which is discarded and destroyed by burning in order to cheaply salvage the steel rims.

Mechanical and air brake hose and mixed auto tires are steady. All grades are unchanged in price from a month ago.

Tubes are easier than last month. The falling off in demand is considered due to the long continued low levels prevailing for crude rubber.

New York Quotations
Carload Lots

September 25, 1928

Mechanicals	Price Per Pound
Mixed black scrap, lb.	$0.00½ @$0.00⅝
Heels, lb.	.00½ @ .00⅝
Hose, air brake, ton	20.00 @25.00
regular soft, ton	13.00 @15.00
No. 1 red, lb.	.02 @ .02¼
No. 2 red, lb.	.01 @ .01¼
White, druggists' sundries, lb.	.02 @ .02½
Mechanical, lb.	.01½ @ .01⅝
Tires	
Pneumatic Standard—	
Mixed auto tires with beads, ton	$22.00 @$22.50
Beadless, ton	28.50 @
White auto tires with beads, ton	38.00 @39.00
Beadless, ton	46.00 @48.00
Mixed auto peelings, ton	30.00 @31.00
Solid—	
Mixed motor truck, clean, ton	17.50 @17.50
Inner Tubes	
No. 1, floating, lb.	.06 @ .06¼
No. 2, compounded, lb.	.03½ @ .03¾
Red, lb.	.04½ @ .04¾
Mixed tubes, lb.	.03½ @ .03⅝
Boots and Shoes	
Boots and shoes, black, lb.	.01½ @ .01⅝
Red and white, lb.	.00½ @ .00¾
Trimmed arctics, black, lb.	.00½ @ .00¾
Untrimmed arctics, lb.	.00½ @ .00⅝
Tennis shoes and soles, lb.	.00½ @ .00¾
Hard Rubber	
No. 1 hard rubber, lb.	.06 @ .07½
Battery jars, black compound, lb.	.01 @ .01½

Rubber Cobwebs in Movies

A realistic impression of age and neglect in old house interiors is given in motion picture production with rubber cobwebs that are formed by spraying with a paint gun a gasoline rubber and zinc white solution which dries practically as soon as it is festooned about old furniture, room corners, etc. With a little experience a "prop" man can produce remarkably fine spun, flimsy, matted, or geometric network effects.

Prayer Mats for Moslems

Inasmuch as many of the tappers of far eastern rubber plantations, as well as many independent producers, are Mohammedans, a considerable trade has recently developed among them in rubber prayer rugs. In one enterprising community a fairly large industry has developed with the object of replacing the more or less expensive textiles with light, low-cost, durable, resilient, portable, and hygienic rugs of rubber. The manufacture of such rugs is carried on chiefly by the Malays who have small rubber holdings in the Setapah Malay Reservation, F. M. S. The tappers take their latex to the Wilkinson Process Rubber Co., Ltd., works near Kuala Lumpur, F. M. S., and there the raw material is transformed into laminated crepe sheeting in large rolls at moderate cost. At their kampongs the Malays, under the direction of their headman, cut the sheeting into rugs of conventional size on which devout Moslems prostrate themselves with faces Mecca-ward. Some of the designs on the rugs bear evidence of uncommon artistic talent and craftmanship. Many rubber prayer rugs are sold to tourists as well as to natives.

Rubber in Webb-Pomerene Law Exports

While figures are not cited, rubberware exports form a considerable part of the total merchandise marketed abroad under the Webb-Pomerene foreign trade act, according to *United States Commerce Reports*. The value of all exports for 1927 exceeded $300,000,000, an increase of about $100,000,000 over 1926. Most of the 56 trade associations which took advantage of the law for collective selling found results very satisfactory. Some of the benefits noted were: More intelligent distribution, a large saving in overhead and operating expense, avoidance of cross shipments and vexing disputes about laws and customs, and elimination of poor packing and other uneconomic troubles; as well as reduction in selling prices to meet foreign competition through operation as a single unit acting as a clearing house. The joint arrangement is said to be especially advantageous to manufacturers who ordinarily do not have a sufficient volume to warrant the separate expense of selling overseas.

Compounding Ingredients

RUBBER goods production in all the leading lines continued to increase during September, except in tire and tube production already at full capacity. This condition calls for corresponding activity in the shipment of compounding supplies. Exceptionally heavy tonnages were required to fill the demand for reinforcing materials, mineral rubber and simple fillers such as whiting, etc. Study is being devoted to improve ingredients for general compounding. The latest addition is Vinegaire Tar a new softener with high modulus and cure stabilizing effect.

ACCELERATORS. Compounders are restricting themselves in their accelerator practice to such as have special fitness for the given line of rubber goods manufactured. Thus the demand for the more popular accelerators is steadily growing.

ANTI-OXIDANTS. Rubber goods makers' realization of the value of insuring lengthened serviceability to their products is advancing the sales of the various anti-oxidants now on the market and stimulating their development.

BENZOL. Operation of the steel industry at 80 per cent capacity restricts benzol production somewhat closely to demand. Supplies are adequate, however, and prices firm.

CARBON BLACK. The rubber trade demand is being actively maintained, prices are strong. A new brand of standard channel black has recently appeared.

CLAY. The demand for reinforcing clay continues active at heavy tonnages.

DEGRAS. Degras is gaining in interest and popularity as a rubber softener.

LITHARGE. Recent advances in pig lead have not yet increased the price of litharge which holds unchanged under steady demand.

LITHOPONE. Shipments indicate good demand for this material on the part of rubber goods makers.

MINERAL RUBBER. This requisite is active to the limit of production apparently at steady prices.

SOLVENT NAPHTHA. Somewhat decreased demand is noted. Prices firm.

V. M. P. NAPHTHA. A strong demand and firm prices characterized the market for this grade of solvent.

STEARIC ACID. Stearic acid is firmer and market steady.

ZINC OXIDE. The call for spot decreased somewhat during the past month but the needs of rubber makers increased about the middle of the month.

New York Quotations

September 25, 1928

Accelerators, Inorganic

Lead, carbonate	lb.	$0.08½	@	
Lead, red	lb.	.10	@	
sublimed white	lb.	.07¼	@	
sublimed blue	lb.	.07¼	@	
super-sublimed white lead	lb.	.08½	@	
Lime, R. M. hydrated	ton	12.50	@	
Litharge	lb.	.09	@	
Magnesia, calcined	lb.	.45	@	.60
carbonate	lb.	.06	@	.07
Orange mineral A.A.A.	lb.	.12	@	

Accelerators, Organic

A-7	lb.	.55	@	.65
A-11	lb.	.62	@	.75
A-16	lb.	.57	@	.65
A-19	lb.	.58	@	.75
A-20	lb.	.64	@	.80
A-32	lb.	.78	@	.95
Aero X	lb.		@	
Aldehyde ammonia	lb.	.65	@	.70
B. B.	lb.		@	
Captax	lb.		@	
Crylene, hard form	lb.		@	
Paste	lb.		@	
Di-ortho-tolylguanidine	lb.	.48	@	.50½
D. P. G.	lb.	.40	@	.45
Ethylidine aniline	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.31	@	.35½
Grasselerator 102	lb.	.58½	@	.61
552	lb.	4.45	@	
808	lb.	.79	@	.85
833	lb.	1.17	@	1.30
Heptene	lb.		@	
Hexamethylene tetramine	lb.	.57½	@	.60
Lead oleate, No. 999	lb.	.15¼	@	
Witco	lb.	.13	@	
Methylene dianiline	lb.	.37	@	
Monex	lb.		@	
Piperidine pentamethylene dithio carbamate	lb.	4.45	@	4.60
Plastone	lb.		@	
R-2	lb.	2.00	@	2.50
R. & H. 40	lb.	.40	@	.42½
50	lb.	.40	@	.42½
Safex	lb.		@	
Super-sulphur, No. 1	lb.		@	
No. 2	lb.		@	
Tensilac No. 39	lb.	.50	@	.52½
No. 41	lb.	.50	@	.52½
Thermlo F.	lb.	.50	@	.55
Thionex	lb.	3.25	@	
Thiocarbanilid	lb.	.22	@	.27
Trimene	lb.		@	
base	lb.		@	
Triphenylguanidine	lb.	.60	@	.67½
Tuads	lb.		@	
Vulcanex	lb.	.58	@	
Vulcanol	lb.	.80	@	
Vulcone	lb.	.58	@	
ZBX	lb.		@	
Z-88	lb.	.50	@	.60
Zimate	lb.		@	

Acids

Acetic 28% (bbls.)	100 lbs.	3.62½	@	3.87½
glacial (carboys)	100 lbs.	13.30	@	13.55
Sulphuric, 66°	100 lbs.	1.60	@	

Alkalies

Caustic soda, solid	lb.	$0.03	@	

Anti-Oxidants

Age-Rite, powder	lb.		@	
resin	lb.		@	
white	lb.		@	
Antox	lb.		@	
Neozone	lb.	.69	@	
A	lb.	.61	@	
Oxynone	lb.	.68	@	.90
Resistox	lb.	.54	@	.65
Stabilite	lb.	.64	@	
V. G. B.	lb.		@	

Colors

BLACK

Bone	lb.	.08	@	
Carbon (see compounding ingredients)				
A. & W. nonfli No. 1	lb.	.40	@	
Drop	lb.	.05½	@	.15
Gastex	lb.		@	
Lampblack (commercial)	lb.	.09	@	

BLUE

A. & W. blue	lb.	1.25	@	5.00
Akco blue	lb.	1.80	@	
Du Pont, N.	100 lbs.	1.35	@	
Marine, A. C.	100 lbs.	1.30	@	
5 R.	100 lbs.	1.00	@	
2 G.	100 lbs.	.90	@	
Huber Brilliant	lb.	4.20	@	4.70
Prussian	lb.	.35	@	.40
Ultramarine	lb.	.15	@	.30

BROWN

Huber Mocha	lb.	1.60	@	2.10
Sienna, Italian, raw	lb.	.05½	@	.12½

GREEN

A. & W. green	lb.	1.25	@	3.00
Akco green	lb.	2.60	@	
Chrome, light	lb.	.27	@	.31
medium	lb.	.28	@	.31
Du Pont, A. C.	100 lbs.	3.00	@	
4 G.	100 lbs.	.60	@	
G. L.	100 lbs.	30	@	
Y. L.	100 lbs.	.75	@	
Huber Brilliant	lb.	4.35	@	
Oxide of chromium	lb.	.33	@	.38

ORANGE

Du Pont, 2 R.	100 lbs.	1.40	@	
R. X.	100 lbs.	1.30	@	
Y. O.	100 lbs.	1.60	@	
Huber Persian	lb.	.50	@	1.00

RED

A. & W. red	lb.	0.75	@	3.00
purple	lb.	2.00	@	4.00
Akco red	lb.	2.75	@	
Antimony, golden, No. 40	lb.		@	
No. 60	lb.	.16	@	.20
golden 15/17%	lb.	.20	@	.25
Aristi	lb.	2.75	@	
Huber Brilliant	lb.	1.35	@	1.85

Colors—(Continued)

RED

Antimony				
Crimson, R.M.P. No. 3	lb.	$0.50	@	$0.60
Sulphur free	lb.	.50	@	.55
7-A.	lb.		@	
Z-2	lb.		@	
Vermilion, No. 5	lb.		@	
No. 15	lb.		@	
Du Pont, R. I.	100 lbs.	1.75	@	
6 B.	100 lbs.	.90	@	
Brilliant A. C.	100 lbs.	.90	@	
Iron Oxides				
bright pure domestic	lb.	.12	@	
bright pure English	lb.	.16	@	
bright reduced English	lb.	.10	@	
bright reduced domestic	lb.	.10	@	
Indian (maroon), pure domestic	lb.	.11	@	
Indian (maroon), pure English	lb.	.11	@	
Indian (maroon), reduced English	lb.	.08½	@	
Indian (maroon), reduced domestic	lb.	.08	@	
Oximony	lb.	.13¼	@	
Spanish red oxide	lb.	.04	@	
Sunburnt red	lb.	.16	@	
Venetian reds	lb.	.03	@	
Vermilion, Eng. quicksilver	lb.	1.90	@	

WHITE

Lithopone	lb.	.05¼	@	
Albalith	lb.		@	
Azolith	lb.	.05¼	@	.05¾
Grasselli	lb.	.05¼	@	.05¾
Sterling	lb.		@	
Vanolith	lb.	.05½	@	
Titanox	lb.	.10	@	.10½
Zinc Oxide				
AAA (lead free)	lb.	.07	@	
Azo (factory):				
ZZZ (lead free)	lb.	.06½	@	.07
ZZ (leaded)	lb.	.06¾	@	.06¾
Z (8% leaded)	lb.	.06¾	@	.06¾
French Process				
Green seal	lb.	.10¾	@	.10¾
Red seal	lb.	.09¾	@	.09¾
White seal	lb.	.11¾	@	.11¾
Kadox	lb.		@	
XX	lb.		@	

YELLOW

A. & W. yellow	lb.	2.00	@	4.00
Akco yellow	lb.	1.45	@	
Cadmium sulphide	lb.	.75	@	.85
Chrome	lb.	.15½	@	.16¼
Du Pont N.	100 lbs.	4.00	@	
R. W.	100 lbs.	.78	@	
Grasselli cadmium	lb.		@	
Huber canary	lb.	3.30	@	3.80
Ochre, domestic	lb.	.01¼	@	.02¾
Oxide, pure	lb.	.08½	@	
Zinc imported	lb.	.23	@	

Compounding Ingredients

Aluminum flake (sacks, c.l.)	ton	21.85	@	
(sacks, l.c.l.)	ton	24.50	@	
Ammonium carbonate pwd.	lb.	.11	@	
lump	lb.	.10½	@	
Asbestine	ton	13.40	@	14.50
Barium, carbonate	ton	57.50	@	60.00

Compounding Ingredients *(Continued)*

Barytes, imported	ton	$27.00	@$34.00
dry ground, white	ton		@
dry ground, off color	ton		@
Foam "A" (f. o. b. St. Louis, bbls.)	ton	23.00	@
Foam "A" (f. o. b. St. Louis, bags)	ton	23.00	@
Basofor	lb.	.04½	@
Blanc fixe, dry	lb.	.03½	@
pulp	ton	42.50	@45.00
Carbon Black			
Aerfloted arrow	lb.	.08½	@ .12
Compressed	lb.	.08	@ .12
Uncompressed	lb.	.07½	@ .11½
Fumonex	lb.	.06	@ .09
Micronex	lb.	.08½	@ .12½
Carrara filler	ton	20.00	@
Chalk	ton	12.00	@
Clay, Blue Ridge, dark	ton		@
Blue Ridge, light	ton		@
China	lb.	.01¼	@
Dixie	ton		@
Langford	ton		@
Mineral flour (Florida)	ton		@
Perfection	ton	14.00	@
Suprex	ton	10.00	@22.00
Tensulite	ton	14.00	@25.00
Cotton flock, black	lb.	.13	@
light-colored	lb.	.10	@ .11
white	lb.	.12	@ .30
Glue, high grade	lb.	.24	@ .28
low grade	lb.	.21	@ .25
Infusorial earth	ton	25.00	@
Mica, amber (fact'y)	ton	80.00	@
Pumice stone, powd.	lb.	.02½	@ .04
Rotten stone (bbls.)	lb.	.02¼	@ .04½
Soap bark	lb.	.15½	@ .16
Soapstone	ton	15.00	@22.00
Talc, domestic	ton	15.00	@
French	ton	18.00	@22.00
Pyrax A	ton		@
B	ton		@
Thermatomic carbon	lb.		@
Velvetex	lb.	.04½	@ .06
Whiting:			
Domestic	100 lbs.	1.00	@
English, cliffstone	100 lbs.	1.50	@
Quaker	ton		@
Snow white	ton		@
Sussex	ton		@
Vancolloid	ton	27.00	@
Vansulite	ton	17.40	@26.00
Westminster Brand	100 lbs.		@
Witco (c.l.) (fact'y)	ton	12.00	@
Whiting, imp. chalk	100 lbs.	.90	@ 1.00
Paris White, Eng. Cliff.	100 lbs.	1.50	@ 3.00

New York Quotations

September 25, 1928

Factice—See Rubber Substitutes

Mineral Rubber

Fluxrite (solid)	lb.	$0.05	@$0.06
Genasco (fact'y)	ton	50.00	@52.00
Gilsonite (fact'y)	ton	37.14	@39.65
Granulated M. R.	ton		@
Hydrocarbon, hard	ton		@
Hydrocarbon, soft	ton		@
Ohmlac Kapak, M. R.	ton	40.00	@90.00
M-4	ton	175.00	@
Paradura (fact'y)	ton	62.50	@65.00
Pioneer, M. R., solid (fac.)	ton	40.00	@42.00
M. R. granulated	ton	50.00	@52.00
Robertson, M. R., solid (fact'y)	ton	34.00	@80.00
M. R. gran. (fact'y)	ton	38.00	@80.00
Vansul Puro	ton	27.00	@33.00

Oils

Mineral	gal.	.18	@
Kerosene	gal.	.15	@
Rapeseed	gal.	.84	@
Red oil, distilled	lb.	.09¾	@ .10¼
Rubber process	gal.	.22	@
Spindle	gal.	.28	@

Rubber Substitutes or Factice

Black	lb.	.08	@ .14
Brown	lb.	.07½	@ .15
White	lb.	.08¾	@ .16

Softeners

Burgundy pitch	100 lbs.	5.00	@
Atlas	100 lbs.	6.50	@
Corn oil	lb.	.10¼	@
Cottonseed oil	lb.	.10½	@
Cycline oil	gal.	.28	@ .35
Degras	lb.	.03½	@ .04½
Fluxrite (fluid)	lb.	.05	@ .06
Moldrite	lb.	.07	@ .07½
Palm oil (Lagos)	lb.	.10	@
Palm oil (Niger)	lb.	.09½	@
Palm oil (Witco)	lb.	.08½	@
Para-flux	gal.	.17	@
Petrolatum, snow white	lb.	.08	@ .08¼
Pigmentar	gal.	.33	@ .41
Pine oil, steam distilled	gal.	.63	@ .64
Rosin K	bbl.	9.45	@
Rosin oil, compounded	gal.	.30	@
No. 3	gal.	.59	@
No. 556	gal.	.50	@
Rubite	lb.	.10½	@
Rubtack	lb.	.08½	@
Shellac, orange	lb.	.70	@

Softeners—*(Continued)*

Stearex	lb.	$0.15	@$0.20
Stearic acid, double pressed	lb.	.13	@ .13½
Tackol	lb.	.09	@ .15
Tar (retort)	bbl.	12.50	@13.00
Tasco W-S No. 1	lb.	.06	@
A	lb.	.05	@
Vansulol	lb.	.10½	@
Vantar (Pine Tar)	gal.	.35	@
Waxene	lb.	.30	@ .40
Woburn oil	lb.	.05½	@ .06

Solvents

Benzol (90%, 7.21 lbs. gal.)	gal.	.27	@ .28
Carbon bisulphide (99.9%, 10.81 lbs. gal.) (drums)	lb.	.05	@ .06
tetrachloride (99.7%, 13.28 lbs. (gal.) (drums)	lb.	.06¼	@ .06½
Cyclohexanone	lb.	.60	@
Dip-Sol	gal.	.13	@
Gasoline			
No. 303			
Tankcars	gal.	.15	@
Drums, c. l.	gal.	.31	@
Drums, l. c. l.	gal.	.36	@
Hexalin	lb.	.60	@
acetate	lb.	.70	@
Rubberlene	gal.	.12½	@
Rub-Sol	gal.	.11	@
Solvent naphtha	gal.	.35	@
Sweet rubber cement naphtha	gal.	.15	@
Turpentine, Venice	lb.	.20	@
steam distilled	gal.	.53	@ .54

Vulcanizing Ingredients

Sulphur			
Velvet flour (240 lb. bbls.)	100 lbs.	2.95	@ 3.50
(150 lb. bags)	100 lbs.	2.60	@ 3.15
Soft rubber (c.l.)	100 lbs.	2.40	@ 2.75
(l.c.l.)	100 lbs.		@
Superfine commercial flour			
(210 lb. bbls.)	100 lbs.	2.55	@ 3.10
(100 lb. bags)	100 lbs.	2.40	@ 2.80
Tire brand, superfine	100 lbs.	1.90	@ 2.25
Tube brand, velvet	100 lbs.	2.40	@ 2.75
Sulphur chloride	lb.	.03¼	@ .03½
Vandex (selenium)	lb.		@

(See also Colors—Antimony)

Waxes

Beeswax, white, com.	lb.	.55	@
carnauba	lb.	.33	@
ceresine, white	lb.	.12	@
montan	lb.	.07½	@
ozokerite, black	lb.	.27	@
green	lb.	.28	@
Paraffin			
122/124 white crude scale	lb.	.06	@
124/126 white crude scale	lb.	.06	@
120/122 fully refined	lb.	.07½	@
125/127 fully refined	lb.	.07½	@

Mineral Rubber from Great Salt Lake

THE Natural Bitumen Products Corp., 835 Howard St., San Francisco, Calif., is now on commercial production at its works on Great Salt Lake, Utah. The land and water rights covering 870 acres have been leased in perpetuity from the State of Utah on a $2 per ton royalty basis, and private asphalt rights have been secured on 600 acres of mainland. The material is said to be a 99 per cent pure mineral rubber, very viscous and ductile enough to be drawn into a fine thread. While suggested for hard rubber mixes, one tire maker avers that it has been used in a cheap tire tread stock in "the proportion of 60 pounds to 14 of crude rubber, testing out with a tensile of 1,800 pounds, stretch 560 per cent, tear 868 pounds, and showing better results than any high tube reclaim."

Having drilled six 12-inch test wells, proving the deposit at 150 feet, the company has just sunk a 6-foot wide steel caisson to a depth of 12 feet below the bituminous stratum. The fluid runs into the recess and is lifted in barrels. Arrangements are being made to pump it and to keep the fluid in the well liquid with steam pipes. A United States geological bulletin describes the substance as "saturated sulphur oil." Two other asphaltic deposits, in South America, are said to be but 39 to 44 per cent pure. Great Salt Lake is said to be rivaled only by the Dead Sea, which also exudes a fine bitumen on its shores, and hence was called by Josephus, the Jewish historian, 96 A. D., Lacus Asphaltites.

The company officers are: President and treasurer, John F. Jannsen; vice presidents, Bruce D. Cruikshank and Joseph E. Bialles; and secretary, Lawrence Clayton.

Ozone Increases Cotton Tensile

Tensile strength of cotton textiles is surprisingly increased by exposure of such fabrics to ozone at a baking temperature, according to P. B. Cochran and H. J. Graham of the Westinghouse research staff. A concentration of 0.5 per cent ozone will cause a 20 per cent increase in half an hour at 110 degrees C. (230 degrees F.) Acceleration may be obtained by increasing either the ozone concentration or the baking heat; or a concentration as low as 0.1 per cent may be used if the temperature be raised to 150 C. A tensile increase of 25 per cent was noted for cotton twine. It is believed that the process might be economically feasible for improving the tensile of many cotton textiles used in the rubber industry.

RUBBER IS AN ESSENTIAL INGREDIENT OF A NEW INSULATING paper said to have exceptional dielectric value. The base is a hydrated cotton fiber, rosin-sized, and in which is incorporated rubber and a protective colloid, and including an acetylated starch and a soluble silicate. R. P. Rose and H. E. Cude, Canada, Patent No. 279,628, April 24, 1928.

Cotton and Fabrics

AMERICAN COTTON. The price for middling spot cotton on September 1 was 19.10 cents compared with 19.90 cents on August 1. During the first week of September the price advanced to 19.50 cents. The second week began with a drop of 100 points to 18.50 cents and futures fell below 18.00 cents. The third week the price reacted and closed on September 22 at 18.90 cents. These price conditions followed the government crop condition of September 8 which indicated 14,439,000 bales. This is 150,000 bales larger than the previous estimate while a decrease had been looked for even below 14,000,000 bales. Another disturbing factor appearing later was the devastating West Indian hurricane which had probably damaged the field crop. Still another was the estimated figure released by the Secretary of the Agricultural Bureau placing the yield at 14,000,000 bales. This suggests the possibility of another official reduction October 8. Spot cotton on September 25 was 18.90 cents.

EGYPTIAN COTTON. During September the chief feature of the staple situation was the remarkably cheap basis on all long cotton except Sakel. It is now evident that this low basis is attracting the attention of spinners but thus far buying has not been in sufficient volume to relieve the situation much, if any. In Egypt the prices of Uppers have come very near to American grades and as the difference in buying terms, gross weights for Americans and net weights for uppers, is all in favor of Egyptians it is readily seen that this cotton is the more attractive purchase. The weakness in Egyptians has been brought about by good crop prospects on a considerably increased acreage in Uppers as compared with the last two years, coupled with an absence of spinner buying.

ARIZONA COTTON. Arizona Pimas are now beginning to move in volume and crop prospects continue promising.

Cotton Fabrics

DUCKS, DRILLS AND OSNABURGS. There is now a better demand for fabrics than for the previous 60 days, in fact a better tone is noted in the general market for cotton fabrics. Supplies in the hands of consumers are limited and cotton mills are manufacturing under definite forward engagement. Activity in the market for mechanical ducks has increased and the production of the duck mills is being absorbed as fast as made. Contracts are being placed, taking up the greater part of production for the balance of this year.

RAINCOAT FABRICS. Trench coat fabrics continue to be the outstanding feature of the market for raincoat material in light tan, red, green and blue.

SHEETINGS. The advance of 50 points in raw cotton prices September 21 resulted in temporary withdrawal from the market of most sellers of sheetings, therefore business is now quiet although prices are firm.

TIRE FABRICS. There have been practically no changes in the tire fabric market situation during the past month. Fabric is in good demand and the mills have orders on their books for nearly all they can make during the balance of the year. Buyers are finding it increasingly difficult to secure desirable near-by deliveries.

New York Quotations

September 25, 1928

Drills

38-inch 2.00-yard	*yard*	$0.17 @
40-inch 3.47-yard		.10⅛ @
50-inch 1.52-yard		.23 @
52-inch 1.90-yard		.18⅜ @
52-inch 2.20-yard		.16½ @
59-inch 1.85-yard		.19½ @

Ducks

38-inch 2.00-yard D. F.	*yard*	.17½ @
40-inch 1.45-yard S. F.		.23⅜ @
72-inch 1.05-yard D. F.		.34¾ @
72-inch 16.66-ounce		.37½ @
72-inch 17.21-ounce		.38⅜ @

MECHANICAL

Hose and belting	*pound*	.33 @
Specials		.37 @

TENNIS

52-inch 1.35-yard	*yard*	.26½ @

Hollands

RUBBER TRADE SPECIAL

RT6B

31 inch	*yard*	.16 @
36-inch		.18 @
40-inch		.20 @

RED SEAL

36-inch		.15½ @
40-inch		.16⅛ @
50-inch		.25 @

GOLD SEAL

40-inch, No. 72		.20¼ @
40-inch, No. 80		.22 @

Osnaburgs

40-inch 2.35-yard	*yard*	$0.14⅝ @
40-inch 2.48-yard		.13⅞ @
40-inch 3.00-yard		.11⅝ @
40-inch 10-oz. part waste	*lb.*	.19⅜ @
37-inch 2.42-yard		.14¼ @

Raincoat Fabrics

COTTON

Bombazine 64 x 60	*yard*	.10¾ @
Bombazine 60 x 48		.09¾ @
Plains 60 x 48		.11½ @
Plaids 48 x 48		.10½ @
Surface prints 64 x 60		.13 @
Surface prints 60 x 48		.12 @
Print cloth 38½-in., 60 x 64		.07¼ @

Sheetings, 40-inch

48 x 48, 2.50-yard	*yard*	.12¼ @	.12½
48 x 48, 2.85-yard		.10⅝ @	.10¾
64 x 68, 3.15-yard		.11⅝ @	.11¾
56 x 60, 3.60-yard		.09½ @	
44 x 48, 3.75-yard		.08¾ @	.08⅞

Sheetings, 36-inch

48 x 48, 5.00 yard	*yard*	.06⅝ @	.06¾
40 x 44, 6.15-yard		.05¾ @	

Tire Fabrics

SQUARE WOVEN 17¾-ounce

Peeler, karded	*pound*	$0.46 @

BUILDER 22/11

Peeler, karded	*pound*	.46 @

BUILDER 10/5

Peeler, karded	*pound*	.42 @

CORD 23/5/3

Peeler, karded, 1 7/16-in.	*pound*	.46 @

CORD 23/4/3

Peeler, karded	*pound*	.47 @

CORD 23/3/3

Peeler, karded	*pound*	.54 @

CORD 15/3/3

Peeler, karded	*pound*	.44 @

CORD 13/3/3

Peeler, karded	*pound*	.43 @

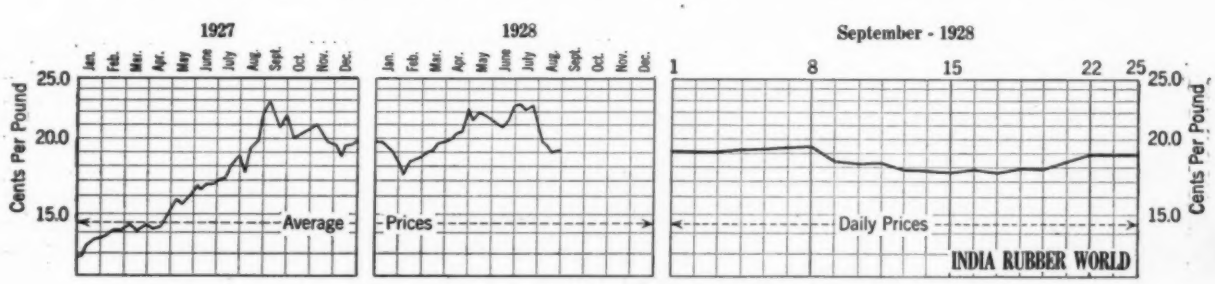
LENO BREAKER

8-oz. Peeler, karded	*pound*	.44 @
10-oz. Peeler, karded		.44 @

CHAFER

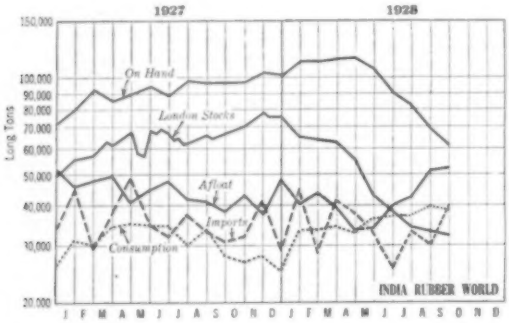
9.5-oz. Peeler, karded	*pound*	@
12-oz. Peeler, karded		@
14-oz. Peeler, karded		.44 @

Ratio Graph of New York Daily Prices of Spot Middling Upland Cotton



Imports, Consumption and Stocks

The accompanying graph covers crude rubber importations, consumption and stocks for 1927 and the first 9 months of 1928. Stocks on hand August 31 were 68,994 tons, a decrease of 6,006



U. S. Imports, Consumption and Stocks

tons below the estimate as made July 31. Consumption during August was 42,925 tons. This exceeded the average for May, June and July by 5,453 tons and is the heaviest consumption of any month thus far this year. The estimated consumption for September is placed at 38,000 tons in anticipation of a possible decrease in tire and tube output.

London stocks decreased between August 25 and September 22, on the former date being 32,815 tons and on the latter 31,884, a decrease of 931 tons.

UNITED STATES CRUDE RUBBER IMPORTS, CONSUMPTION AND STOCKS

Twelve Months	Imports Tons	Consumption Tons	Stocks On Hand Tons	Stocks Afloat Tons	London Tons	Singapore and Penang Tons
1925	384,837	389,136	51,000*	48,000*	.....	.....
1926	411,900	366,140	72,510*	52,019*	.....	.....
1927	426,258	370,915	100,130*	47,939*	63,207*	25,868*
1928						
January	46,200	34,403	110,114	41,256	66,285	25,868
February	29,445	33,703	108,955	43,316	62,500	22,867
March	40,894	35,688	114,061	39,324	61,000	20,538
April	37,240	32,779	113,800	33,986	55,000	16,946
May	32,883	37,333	105,356	34,374	43,716	17,687
June	25,792	37,676	90,189	40,000	35,248	18,207
July	33,382	37,407	83,242	42,304	35,445	18,663
August	29,805	42,925	68,994	51,875	31,884††	18,971
Sept. (est.)	40,000	38,000	61,000	53,000	.....	.....

*December 31.
††September 22.
The 1928 figures, unless otherwise specified, are all as of the first of each month.

Ceylon Rubber Exports

January 1 to June 30, 1928

	Tons
To United Kingdom	5,769.95
Continent	1,822.75
Australia	407.51
America	13,812.50
Egypt	6.00
Africa	11.25
India	11.91
Japan	59.34
Other countries in Asia	3.90
Total	21,905.11
For the same period last year	27,252.51

ANNUAL EXPORTS, 1921-1927

	Tons
For the year 1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14
1921	40,210.31

United States Imports of Crude Rubber and Liquid Latex—By Countries

JULY, 1928

From	Crude Rubber[1] Pounds	Crude Rubber[1] Value	Liquid Latex Pounds[2]	Liquid Latex Value
France	11,533	$2,338	.....	.....
Germany	70,369	11,706	.....	.....
Netherlands	22,919	3,696	.....	.....
United Kingdom	9,971,813	2,633,399	.....	.....
Bolivia	68,429	12,966	.....	.....
Brazil	1,217,921	197,027	.....	.....
Colombia	1,150	490	.....	.....
Ecuador	18,255	1,984	.....	.....
Surinam	1,332	293	.....	.....
Peru	51,243	11,800	.....	.....
Uruguay	41,022	10,896	.....	.....
British India	231,840	59,028	.....	.....
British Malaya	38,622,276	7,074,615	422,598	$82,406
Ceylon	3,577,650	679,796	.....	.....
Java and Madura	7,736,950	1,657,362	6,376	3,955
Other Netherlands East Indies	7,739,845	1,651,569	84,018	16,334
Philippine Is.	64,860	21,675	.....	.....
Australia	400	97	.....	.....
British Oceania	6,510	1,137	.....	.....
New Zealand	48,365	10,196	.....	.....
Total	69,504,682	$14,042,070	512,992	$102,695
Long tons	31,029	.....	229	.....

[1]Imports of guayule rubber from Mexico during July, 1928, totaled 427,900 pounds, valued $100,342. Total rubber imports amounted to 31,449 long tons.

[2]Pounds of dry rubber contained in latex imported; crude rubber content is taken as three pounds per gallon of latex.

Netherland East Indies Exports

	Long Tons—1928 Jan.	Feb.	March	April	May	Jan.-May 1928	1927
Java & Madura	4,870	4,061	4,017	3,993	4,960	21,901	24,008
Sumatra E. C.	7,984	6,756	5,900	5,273	5,564	31,477	30,965
Other N. E. I.[1]							
Atjeh & Dep.	374	300	404	201	332	1,611	1,565
Riouw & Dep.	823	772	624	467	981	3,667	4,755
Djambi	2,588	2,442	2,799	1,686	3,606	13,121	13,948
Palembang	2,195	1,277	1,263	476	1,340	6,551	9,243
Lampongs	210	214	309	200	275	1,208	1,171
Benkoelen	4	2	3	6	3	18	39
Sumatra W. C.	197	154	117	42	28	538	678
Tapancelo	594	434	412	343	417	2,200	3,316
Banka & Dep.	121	93	41	30	37	322	994
Billiton	14	11	9	3	2	39	69
W. Bor.	1,883	1,167	1,553	669	1,662	6,934	11,306
S. & E. Bor.	2,756	1,749	2,133	1,355	1,726	9,719	10,514
Menado	19	19	12	17	16	83	73
Celebes & Dep.	1	2	8	5	2	18	20
Amboina	5	2	3	3	1	14	..
Total[1]	11,784	8,638	9,690	5,503	10,428	46,043	57,691
Grand total	24,638	19,455	19,607	14,769	20,952	99,421	112,864

[1]Exports from "Other N. E. I." consist mostly of native rubber; deduction of approximately 33⅓ per cent necessary for moisture.

Lessening Benzene Hazard

In an analysis of the air in rubber and other industrial laboratories, J. J. Bloomfield of the United States Public Health Service found concentration of vapor varying from 28 to 223 parts per million, the latter being noted where benzene was centrifuged. The vapor in the air and the health hazard are also increased by operators washing hands and arms in the solvent. For cleansing, the use of xylene or other less toxic solvent is advised. Poisonous effects in air are said to be marked with as low as 100 parts concentration.

Complete text of the standard interpretation of the new tire warranty as adopted September 21 by the Rubber Association of America and the Rubber Institute is on page 57.

United States Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	June, 1928		Six Months Ended June, 1928	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*Free*				
Crude rubber	62,192,196	$14,121,219	470,726,336	$150,609,333
Balata	19,583	6,799	449,931	143,805
Jelutong or Pontianak	656,311	91,152	7,570,965	1,204,519
Gutta percha	63,091	12,374	1,732,505	442,383
Guayule	950,000	220,081	6,462,952	1,655,187
Rubber scrap	1,253,879	31,002	10,188,241	396,730
Totals	65,135,060	$14,482,627	497,130,930	$154,487,957
Chicle *dutiable*	617,880	$319,454	8,933,280	$4,563,791
MANUFACTURED—*Dutiable*				
Rubber belting	41,260	$23,738	273,387	$153,544
Rubber tires	395	2,750	2,915	57,612
Other manufactures of rubber	.....	133,081	.....	804,998
Totals	41,655	$159,569	276,302	$1,016,154

EXPORTS OF FOREIGN MERCHANDISE

RUBBER MANUFACTURES				
Crude rubber	5,870,358	$1,400,697	35,249,402	$10,754,041
Balata	24,188	9,273	148,814	59,399
Gutta percha, rubber substitutes and scrap	57	20	119,724	13,940
Rubber manufactures	.....	186,301	.....	291,245
Totals	5,894,603	$1,596,291	35,517,940	$11,118,625

EXPORTS OF DOMESTIC MERCHANDISE

MANUFACTURED				
Reclaimed	784,830	$125,554	10,367,806	$841,380
Scrap and old	3,210,032	151,069	22,550,470	1,249,286
Rubberized piece goods and hospital sheeting *sq. yd.*	163,870	82,764	977,103	479,706
Footwear				
Boots *pairs*	58,769	142,401	356,493	881,810
Shoes *pairs*	177,300	188,606	811,714	695,208
Canvas shoes with rubber soles *pairs*	458,381	15,840	2,695,643	1,941,099
Rubber water bottles and fountain syringes *number*	25,328	18,588	146,612	94,053
Rubber gloves *doz. pairs*	15,733	27,060	53,982	136,412
Other druggists' rubber sundries	.....	27,606	.....	190,894
Rubber balloons *gross*	51,976	60,459	288,078	335,188
Rubber toys and balls	.....	19,898	.....	91,828
Bathing caps *doz.*	12,937	34,037	118,538	263,369
Hard rubber goods				
Electrical hard rubber goods	85,240	23,420	671,496	145,164
Other hard rubber goods	.....	30,325	.....	173,460
Tires				
Casings, automobile *number*	212,774	2,602,160	1,221,782	15,570,914
Tubes, automobile *number*	132,279	277,307	805,423	1,745,823
Other casings and tubes *number*	3,938	11,499	28,600	58,701
Solid tires for automobiles and motor trucks *number*	4,147	135,816	27,527	970,511
Others	88,476	20,893	1,069,819	244,237
Tire accessories	.....	161,967	.....	894,265
Rubber and friction tape	134,888	38,155	722,850	225,789
Belting	264,667	161,660	2,470,989	1,395,477
Hose	609,849	222,340	3,635,148	1,318,603
Packing	184,848	131,160	1,480,923	699,059
Soles and heels	113,603	171,468	769,370	1,179,154
Thread	151,328	167,081	789,610	887,432
Rubber bands and erasers	80,087	51,760	469,998	322,785
Other rubber manufactures	.....	218,210	.....	1,371,511
Totals	.....	$5,319,103	.....	$34,403,118

Crude Rubber Imports by Customs Districts

	*July, 1928		Seven Months Ended *July, 1928	
	Pounds	Value	Pounds	Value
Massachusetts	2,219,384	$386,796	26,191,639	$7,786,622
Buffalo	.....	.....	12,060	2,290
New York	58,681,344	11,198,562	454,623,612	137,340,187
Philadelphia	4,648,526	1,694,056	21,046,752	7,230,340
Maryland	1,428,667	295,209	18,369,022	5,951,021
Los Angeles	2,532,681	461,796	16,474,433	5,083,039
San Francisco	204,135	48,852	740,589	210,733
Oregon	11,200	2,042	105,535	33,556
Michigan	.....	.....	33,600	10,080
Ohio	190,937	39,671	2,648,061	883,316
St. Louis	.....	.....	280,000	110,749
Wisconsin	.....	.....	56,000	21,982
Colorado	100,800	17,781	371,600	108,562
Totals	70,017,674	$14,144,765	540,952,903	$164,772,477

*Including latex, dry rubber content.

Progress is slowly but surely being made toward getting ready to develop the Ford rubber planting concession on the Tapajos River in Brazil. *Turn to page 60.*

United Kingdom Statistics

IMPORTS

	July, 1928		Seven Months Ended July, 1928	
UNMANUFACTURED	Pounds	Value	Pounds	Value
Crude Rubber				
From—				
Straits Settlements	7,035,300	£289,115	51,039,500	£2,701,747
Federated Malay States	2,753,300	113,083	26,742,800	1,383,843
British India	1,065,100	42,510	8,520,100	486,822
Ceylon and Dependencies	2,470,600	96,412	16,673,600	919,442
Other Dutch possessions in Indian Seas	2,064,900	77,494	14,398,200	803,999
Dutch East Indies (except Other Dutch possessions in Indian Seas)	2,050,500	89,186	16,132,900	886,196
Other countries in East Indies and Pacific not elsewhere specified	115,400	4,452	2,116,100	111,231
Brazil	447,500	18,535	2,709,200	140,576
South and Central America (except Brazil)	1,300	53	174,200	8,874
West Africa				
French West Africa	.....	.....	89,100	3,752
Gold Coast	36,800	1,431	333,000	17,465
Other parts of West Africa	166,500	6,450	1,146,500	58,216
East Africa, including Madagascar	93,000	3,206	782,100	42,276
Other countries	173,000	7,570	1,079,700	53,437
Totals	18,473,200	£749,497	141,937,000	£7,617,876
Waste and reclaimed rubber	693,600	8,188	5,270,300	69,976
Gutta percha and balata	227,800	18,164	2,067,700	171,866
Rubber substitutes	3,000	94	15,000	447
Totals	19,397,600	£775,943	149,290,000	£7,860,165
MANUFACTURED				
*†‡Tires and tubes				
Pneumatic				
Outer covers	.....	£55,716	.....	£475,827
Inner tubes	.....	11,448	.....	95,739
Solid tires	.....	8,324	.....	37,508
Boots and shoes *doz. pairs*	75,625	135,631	508,420	842,022
Other rubber manufactures	.....	115,710	.....	1,100,130
Totals	.....	£326,829	.....	£2,551,226

EXPORTS

UNMANUFACTURED				
Waste and reclaimed rubber	1,801,500	£13,980	17,551,100	£143,249
Rubber substitutes	64,100	1,294	328,900	7,997
Totals	1,865,600	£15,274	17,880,000	£151,246
MANUFACTURED				
‡Tires and tubes				
Pneumatic				
Outer covers	.....	£298,763	.....	£1,516,891
Inner tubes	.....	50,782	.....	263,208
Solid tires	.....	18,242	.....	140,649
Boots and shoes *doz. pairs*	25,371	42,889	157,979	251,305
Other rubber manufactures	.....	272,862	.....	1,847,186
Totals	.....	£683,538	.....	£4,019,239

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED				
Crude Rubber				
To—				
Russia	1,334,200	£77,867	7,413,300	£491,481
Sweden, Norway and Denmark	319,500	15,993	1,807,100	114,937
Germany	2,390,100	98,201	24,538,000	1,469,988
Belgium	626,400	24,945	5,847,400	351,260
France	4,010,800	163,775	20,799,000	1,181,890
Spain	91,700	6,348	1,410,700	95,853
Italy	1,385,300	56,783	9,833,100	555,751
Other European countries	337,400	20,370	2,844,200	209,239
United States	10,957,800	599,854	74,983,600	4,766,636
Canada	.....	.....	15,800	998
Other countries	97,900	6,112	877,400	63,240
Totals	21,551,100	£1,070,248	150,369,600	£9,301,273
Waste and reclaimed rubber	50,200	1,113	164,300	3,189
Gutta percha and balata	84,600	5,479	519,600	41,776
Rubber substitutes	.....	.....	3,700	194
Totals	21,685,900	£1,076,840	151,057,200	£9,346,432
MANUFACTURED				
*‡Tires and tubes				
Pneumatic				
Outer covers	.....	£16,958	.....	£98,997
Inner tubes	.....	2,805	.....	20,869
Solid tires	.....	214	.....	2,093
Boots and shoes *doz. pairs*	1,323	2,162	8,432	14,563
Other rubber manufactures	.....	11,452	.....	83,369
Totals	.....	£33,591	.....	£219,891

*After April 12, 1927, tires and tubes imported or exported with complete vehicles or chassis, or fitted to wheels imported separately, are included under complete vehicles or parts.

†Motor cars, motorcycles, parts and accessories, liable to duty from September 29, 1915, until August 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts and accessories were exempt from duty until April 30, 1926, inclusive, and rubber tires and tubes until April 11, 1927, inclusive.

‡Tires and tubes included prior to April 12, 1927.

Crude Rubber Arrivals at New York as Reported by Importers

Plantations

	Cases
Aug. 14. By "Deutschland," Europe.	
The Meyer & Brown Corp.	74
Aug. 15. By "Western Ally," Europe.	
Robert Badenhop Corp.	10
Aug. 16. By "Missouri," London.	
Baird Rubber & Trading Co., Inc.	*847
Hood Rubber Co.	*48
Aug. 17. By "City Newcastle," Far East.	
H. A. Astlett & Co.	1,392
Robert Badenhop Corp.	300
Baird Rubber & Trading Co., Inc.	100
Bierrie & Co., Inc.	360
General Rubber Co.	2,207
Haldane & Co., Inc.	400
Littlejohn & Co., Inc.	5,661
The Meyer & Brown Corp.	1,560
The Meyer & Brown Corp.	*50
Poel & Kelly, Inc.	630
Rogers Brown & Crocker Bros., Inc.	450
Chas. T. Wilson Co., Inc.	156
Aug. 17. By "Kasama," Far East.	
Haldane & Co., Inc.	150
Littlejohn & Co., Inc.	2,936
The Meyer & Brown Corp.	392
Rogers Brown & Crocker Bros., Inc.	104
Chas T. Wilson Co., Inc.	262
Aug. 18. By "Veendam," Far East.	
The Meyer & Brown Corp.	317
Aug. 20. By "American Merchant," London.	
Baird Rubber & Trading Co., Inc.	255
The Meyer & Brown Corp.	835
Aug. 20. By "Malakand," Far East.	
General Rubber Co.	560
Chas. T. Wilson Co., Inc.	18
Aug. 20. By "Minnetonka," London.	
Baird Rubber & Trading Co., Inc.	524
Bierrie & Co., Inc.	1,569
General Rubber Co.	5
Littlejohn & Co., Inc.	893
The Meyer & Brown Corp.	3,259
Aug. 20. By "Pres. Polk," Far East.	
H. A. Astlett & Co.	2,465
Robert Badenhop Corp.	1,144
Baird Rubber & Trading Co., Inc.	650
General Rubber Co.	1,997
Haldane & Co., Inc.	1,030
Littlejohn & Co., Inc.	7,107
The Meyer & Brown Corp.	910
Poel & Kelly, Inc.	1,254
Rogers Brown & Crocker Bros., Inc.	674
Chas. T. Wilson Co., Inc.	795
Aug. 21. By "Arabic," Europe.	
The Meyer & Brown Corp.	210
Aug. 22. By "Alynbank," Far East.	
H. A. Astlett & Co.	182
General Rubber Co.	475
Hood Rubber Co.	*80
Littlejohn & Co., Inc.	1,595
Chas. T. Wilson Co., Inc.	88
Aug. 22. By "Eelbeck," Far East.	
H. A. Astlett & Co.	330
Robert Badenhop Corp.	100
Baird Rubber & Trading Co., Inc.	330
Haldane & Co., Inc.	150
Littlejohn & Co., Inc.	240
Chas. T. Wilson Co., Inc.	437
Aug. 22. By "Kendal Castle," Far East.	
H. A. Astlett & Co.	613
Robert Badenhop Corp.	650
Baird Rubber & Trading Co., Inc.	200
General Rubber Co.	2,728
Haldane & Co., Inc.	*250
Littlejohn & Co., Inc.	3,590
The Meyer & Brown Corp.	705
Poel & Kelly, Inc.	262
Rogers Brown & Crocker Bros., Inc.	*50
Chas. T. Wilson Co., Inc.	652
Aug. 22. By "Memphis City," Far East.	
H. A. Astlett & Co.	233
Robert Badenhop Corp.	1,450
General Rubber Co.	5,444
Littlejohn & Co., Inc.	360
The Meyer & Brown Corp.	270
Poel & Kelly, Inc.	150
Rogers Brown & Crocker Bros., Inc.	100
Rogers Brown & Crocker Bros., Inc.	*50
Chas. T. Wilson Co., Inc.	933
Aug. 22. By "Valemore," London.	
Baird Rubber & Trading Co., Inc.	424
Bierrie & Co., Inc.	105
Aug. 24. By "City of Kobe," Far East.	
General Rubber Co.	41
Haldane & Co., Inc.	380
Hood Rubber Co.	*240
Littlejohn & Co., Inc.	812
The Meyer & Brown Corp.	328
Chas. T. Wilson Co., Inc.	112
Aug. 26. By "Pres. Lincoln," Far East.	
H. A. Astlett & Co.	†100
Littlejohn & Co., Inc.	†250
The Meyer & Brown Corp.	†706
Poel & Kelly, Inc.	†400
Rogers Brown & Crocker Bros., Inc.	†150
Aug. 27. By "American Banker," London.	
Baird Rubber & Trading Co., Inc.	211
Littlejohn & Co., Inc.	514
The Meyer & Brown Corp.	160
Aug. 27. By "Caronia," Europe.	
General Rubber Co.	30
The Meyer & Brown Corp.	527
Chas. T. Wilson Co., Inc.	83
Aug. 27. By "Laconia," Europe.	
Hood Rubber Co.	*39
Littlejohn & Co., Inc.	173
Chas. T. Wilson Co., Inc.	19
Aug. 27. By "Silveroak," Far East.	
General Rubber Co.	†1,422
Aug. 28. By "Minnekahda," Europe.	
H. A. Astlett & Co.	386
Bierrie & Co., Inc.	503
General Rubber Co.	320
Haldane & Co., Inc.	309
Littlejohn & Co., Inc.	2,889
The Meyer & Brown Corp.	3,077
Rogers Brown & Crocker Bros., Inc.	131
Aug. 28. By "Thuringia," Europe.	
The Meyer & Brown Corp.	102
Aug. 31. By "Merauke," Far East.	
H. A. Astlett & Co.	1,121
Robert Badenhop Corp.	594
Baird Rubber & Trading Co., Inc.	182
Bierrie & Co., Inc.	73
General Rubber Co.	2,050
Haldane & Co., Inc.	481
Littlejohn & Co., Inc.	2,374
The Meyer & Brown Corp.	331
The Meyer & Brown Corp.	*338
Poel & Kelly, Inc.	68
Raw Products Co.	120
Chas. T. Wilson Co., Inc.	116
Sept. 1. By "Helenus," Far East.	
H. A. Astlett & Co.	1,134
Robert Badenhop Corp.	1,225
Baird Rubber & Trading Co., Inc.	525
Bierrie & Co., Inc.	743
General Rubber Co.	5,138
Haldane & Co., Inc.	908
Littlejohn & Co., Inc.	2,913
The Meyer & Brown Corp.	1,228
Poel & Kelly, Inc.	1,381
Raw Products Co.	30
Rogers Brown & Crocker Bros., Inc.	2,329
Rogers Brown & Crocker Bros., Inc.	*365
Chas. T. Wilson Co., Inc.	1,070
Sept. 1. By "Norwegian," Europe.	
Hood Rubber Co.	*128
Littlejohn & Co., Inc.	118
The Meyer & Brown Corp.	*260
Sept. 1. By "Rotterdam," Europe.	
General Rubber Co.	474
Sept. 2. By "American Trader," London.	
Rogers Brown & Crocker Bros., Inc.	153
Sept. 2. By "Carinthia," Europe.	
Littlejohn & Co., Inc.	33
Sept. 2. By "Lancaster Castle," Far East.	
H. A. Astlett & Co.	1,116
Robert Badenhop Corp.	400
Baird Rubber & Trading Co., Inc.	225
Bierrie & Co., Inc.	250
General Rubber Co.	4,678
Haldane & Co., Inc.	826
Littlejohn & Co., Inc.	3,872
The Meyer & Brown Corp.	2,110
Poel & Kelly, Inc.	350
Poel & Kelly, Inc.	*250
Rogers Brown & Crocker Bros., Inc.	650
Chas. T. Wilson Co., Inc.	514
Sept. 2. By "London Mariner," London.	
Littlejohn & Co., Inc.	73
Sept. 3. By "Maihar," Far East.	
Robert Badenhop Corp.	100
General Rubber Co.	2,380
Littlejohn & Co., Inc.	112
The Meyer & Brown Corp.	280
Chas. T. Wilson Co., Inc.	255
Sept. 3. By "Minnewaska," London.	
Baird Rubber & Trading Co., Inc.	887
Bierrie & Co., Inc.	150
General Rubber Co.	264
Littlejohn & Co., Inc.	70
The Meyer & Brown Corp.	1,111
Sept. 3. By "Silverash," Far East.	
Littlejohn & Co., Inc.	†30
Sept. 4. By "Pres. Adams," Far East.	
H. A. Astlett & Co.	2,100
Robert Badenhop Corp.	750
Bierrie & Co., Inc.	100
General Rubber Co.	2,352
Haldane & Co., Inc.	1,200
Littlejohn & Co., Inc.	2,324
The Meyer & Brown Corp.	1,213
Poel & Kelly Inc.	500
Raw Products Co.	499
Rogers Brown & Crocker Bros., Inc.	350
Rogers Brown & Crocker Bros., Inc.	*15
Chas. T. Wilson Co., Inc.	1,058
Sept. 4. By "Silvermaple," Far East.	
H. A. Astlett & Co.	532
Robert Badenhop Corp.	605
Bierrie & Co., Inc.	30
General Rubber Co.	5,589
Haldane & Co., Inc.	760
Littlejohn & Co., Inc.	5,263
The Meyer & Brown Corp.	1,358
The Meyer & Brown Corp.	*164
Poel & Kelly, Inc.	385
Rogers Brown & Crocker Bros., Inc.	439
Chas. T. Wilson Co., Inc.	50
Sept. 4. By "Tuscania," London.	
Bierrie & Co., Inc.	50
Sept. 5. "Fairfield City," Far East.	
H. A. Astlett & Co.	2,674
Robert Badenhop Corp.	585
General Rubber Co.	3,975
Haldane & Co., Inc.	410
Littlejohn & Co., Inc.	1,498
The Meyer & Brown Corp.	501
The Meyer & Brown Corp.	*125
Poel & Kelly, Inc.	857
Rogers Brown & Crocker Bros., Inc.	620
Chas. T. Wilson Co., Inc.	558
Sept. 6. By "Chinese Prince," Far East.	
H. A. Astlett & Co.	2,107
Robert Badenhop Corp.	1,644
Robert Badenhop Corp.	*200
Bierrie & Co., Inc.	549
General Rubber Co.	5,185
Haldane & Co., Inc.	708
Hood Rubber Co.	*250
Littlejohn & Co., Inc.	5,719
The Meyer & Brown Corp.	1,152
Poel & Kelly, Inc.	450
Rogers Brown & Crocker Bros., Inc.	946
Chas. T. Wilson Co., Inc.	1,182
Sept. 8. By "Scythia," Europe.	
Littlejohn & Co., Inc.	171
Sept. 9. By "Greystoke Castle," Far East.	
H. A. Astlett & Co.	508
Robert Badenhop Corp.	550
Bierrie & Co., Inc.	145
General Rubber Co.	3,950
Haldane & Co., Inc.	150
Hood Rubber Co.	*50
Littlejohn & Co., Inc.	3,445
The Meyer & Brown Corp.	724
Poel & Kelly, Inc.	75
Rogers Brown & Crocker Bros., Inc.	200
Chas. T. Wilson Co., Inc.	627
Sept. 9. By "Pres. Madison," Far East.	
H. A. Astlett & Co.	†390
Littlejohn & Co., Inc.	†450
The Meyer & Brown Corp.	†150
Sept. 10. By "American Farmer, London.	
Baird Rubber & Trading Co., Inc.	1,779
Bierrie & Co., Inc.	153
Littlejohn & Co., Inc.	167
Sept. 10. By "Minnesota," London.	
Baird Rubber & Trading Co., Inc.	2,328
Bierrie & Co., Inc.	2,505
General Rubber Co.	125
Littlejohn & Co., Inc.	1,240
The Meyer & Brown Corp.	894
Rogers Brown & Crocker Bros., Inc.	152
Sept. 10. By "Ryndam," Europe.	
General Rubber Co.	310
Chas. T. Wilson Co., Inc.	182
Sept. 10. By "West Honaker," Far East.	
H. A. Astlett & Co.	680
Robert Badenhop Corp.	100
General Rubber Co.	112
Littlejohn & Co., Inc.	15
The Meyer & Brown Corp.	150
Chas. T. Wilson Co., Inc.	618
Sept. 12. By "Blommersdyk," Far East.	
Robert Badenhop Corp.	600
Baird Rubber & Trading Co., Inc.	22
Bierrie & Co., Inc.	50
General Rubber Co.	2,670
Haldane & Co., Inc.	151
Littlejohn & Co., Inc.	1,332
The Meyer & Brown Corp.	469
Poel & Kelly, Inc.	101
Rogers Brown & Crocker Bros., Inc.	493
Sept. 14. By "City of Durban," Far East.	
Hood Rubber Co.	80
Littlejohn & Co., Inc.	1,850
The Meyer & Brown Corp.	111
Chas. T. Wilson Co., Inc.	226
Sept. 14. By "City of Shanghai," Far East.	
Hood Rubber Co.	*80
Littlejohn & Co., Inc.	2,099
The Meyer & Brown Corp.	50
Chas. T. Wilson Co., Inc.	32
Sept. 15. By "Ambridge," Europe.	
Robert Badenhop Corp.	88
Sept. 15. By "Mahseer," Far East.	
Robert Badenhop Corp.	50
Bierrie & Co., Inc.	100
Littlejohn & Co., Inc.	400
Sept. 15. By "Saleier," Far East.	
Baird Rubber & Trading Co., Inc.	54
Bierrie & Co., Inc.	323
Littlejohn & Co., Inc.	1,289
The Meyer & Brown Corp.	626
Rogers Brown & Crocker Bros., Inc.	337
Chas. T. Wilson Co., Inc.	471

*Arrived at Boston.
†Arrived at Los Angeles.

Africans

	Cases
Aug. 23. By "Garstendijk," Europe.	
Hood Rubber Co.	*156
Aug. 31. By "Coahoma County," Antwerp.	
Hood Rubber Co.	1,227
Sept. 8. By "Sarcoxie," Europe.	
Littlejohn & Co., Inc.	162
Sept. 9. By "Samaria," Europe.	
Littlejohn & Co., Inc.	28
Sept. 10. By "Ryndam," Europe.	
N. Diamond & Co., Inc.	32

Balata

	Cases
Sept. 6. By "Aidan," South America.	
Paul Bertuch & Co., Inc.	38

Rubber Latex

	Cases
Aug. 22. By "Kendal Castle," Far East.	
General Rubber Co.	gal. 38,163
Aug. 22. By "Memphis City," Far East.	
General Rubber Co.	gal. 61,946
Sept. 10. By "Greystoke Castle," Far East.	
General Rubber Co.	gal. 33,854

Paras and Caucho

	Fine Cases	Medium Cases	Coarse Cases	Caucho Cases	Miscel. Cases
August 24. By "Hubert," South America.					
H. A. Astlett & Co.	59	...	325	158	...
Paul Bertuch & Co., Inc.	360	...	12	...	...
General Rubber Co.	981	...	95	45	4
Littlejohn & Co., Inc.	19	...	59	10	...
August 27. By "Bangu," South America.					
H. A. Astlett & Co.	...	...	73	73	...
September 4. By "Ardenhall," South America.					
H. A. Astlett & Co.	62	1	2	8	...
Paul Bertuch & Co., Inc.	77	...	...	...	...
General Rubber Co.	...	...	35	...	...
Littlejohn & Co., Inc.	29	...	...	...	...
September 6. By "Aidan," South America.					
H. A. Astlett & Co.	90	...	19	6	...
Paul Bertuch & Co., Inc.	...	...	126	...	...
General Rubber Co.	...	...	15	120	...
Littlejohn & Co., Inc.	490	...	10	...	...
The Meyer & Brown Corp.	...	...	...	195	...

United States Crude and Waste Rubber Imports for 1928 by Months

	Plantations	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Total 1928	Total 1927	Balata	Miscellaneous	Waste
January ..... tons	43,668	1,580	433	126	435	1	46,243	45,827	120	1,292	248
February	27,852	756	125	125	587	..	29,445	27,701	58	517	310
March	37,545	2,430	72	92	755	..	40,894	35,054	154	741	830
April	36,108	573	15	20	524	..	37,240	48,632	202	888	18
May	31,564	849	14	5	451	..	32,883	36,285	71	923	142
June	24,752	582	25	9	424	..	25,792	33,142	14	727	165
July	32,536	585	11	62	188	..	33,382	38,416	108	895	33
August	28,675	1,010	105	15	...	..	29,805	32,804	62	775	219
Total, eight months, 1928 ..... tons	262,700	8,365	800	454	3,364	1	275,684	.....	789	6,758	1,965
Total, eight months, 1927 ..... tons	280,363	11,830	1,434	971	3,233	30	.....	297,861	660	8,513	4,385

Compiled from statistics supplied by the Rubber Association of America, Inc.

British Malaya

RUBBER EXPORTS

An official cablegram from Singapore to the Malay States Information Agency, Malaya House, 57 Charing Cross, London, S. W. 1, England, states that the amount of rubber exported from British Malaya in August last totaled 35,593 tons. The amount of rubber imported was 15,114 tons of which 11,688 tons were declared as wet rubber. The following are comparative statistics:

	1927 Gross Exports Tons	1927 Foreign Imports Tons	1928 Gross Exports Tons	1928 Foreign Imports Tons
January	34,946	14,995	27.731	16 618
February	27,528	11,697	28,813	12.911
March	41,346	17,462	27.813	10.508
April	29,041	13,069	20.029	9.335
May	31,393	15,491	26,403	10.350
June	32,607	14,706	22,930	16 168
July	23,947	12,697	30,405	13.383
August	30,371	17,105	35,593	15.114
Totals	251,179	117,222	219,717	104,387

The above figures represent the totals compiled from declarations received up to the last day of the month for export from and import to all ports of British Malaya and not necessarily the actual quantity shipped or landed during that month.

DISTRIBUTION

The following is a comparative return of distribution of shipments during the months of July and August, 1928:

	July, 1928 Tons	August, 1928 Tons
United Kingdom	3,768	5,963
United States	21,548	24,842
Continent of Europe	2,848	2,552
British Possessions	686	591
Japan	1,516	1,590
Other foreign countries	39	55
Totals	30,405	35.593

Dispersed Rubber-Resin Filler

A new tacky compounding material which it is said may be largely used to replace crude rubber is formed by treating resinous material of vegetable origin (wood pitches, oleoresins, balsams, hard, soft, and liquid resins) with a solvent (pinene, turpentine, spindle oil, and solvent naphtha), emulsifying the softened material in water and intermixing the emulsion with an aqueous dispersion of rubber. John McGavack (to Dominion Rubber Co., Ltd.), Canadian Patent No. 281,646, July 10, 1928.

World Rubber Production—Net Exports

Long Tons—1928

	March	April	May	June	July	August
British Malaya:						
Gross exports	27,813	20,029	26,403	22,930	30,405	35,593
Imports	10,508	9,335	10,350	16,168	13,383	15,114
Net	17,305	10,694	16,053	6,762	17,022	20,479
Ceylon	3,460	3,460	3,125	3,125	4,798	5,580
India and Burma	775	789	654	963	1,043	.....
Sarawak	645	630	842	926	905	1,227
B. N. Borneo	*500	*500	*500	*500	*500	*500
Siam	269	258	241	451	366	544
Java and Madura	3,999	3,993	4,943	5,419	5,602	.....
Sumatra East Coast	5,826	5,040	5,355	5,863	7,566	.....
Other N. E. Indies	9,690	5,538	10,382	13,623	11,424	.....
French Indo-China	613	518	619	902	744	779
Amazon Valley	2,750	1,014	2,062	1,399	1,264	1,732
Other America	204	239	51	.....	.....	.....
Mexican Guayule	575	512	452	424	192	.....
Africa	432	572	.....	.....	.....	.....
Total	47,043	33,757	.....	.....	.....	.....

*Estimated.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Absorption—Net Imports

Long Tons—1928

	Feb.	March	April	May	June	July
Australia	616	918	832	655	348	591
Belgium	599	816	575	746	743	895
Canada	2,553	2,989	1,938	2,180	2,632	2,692
Czechoslovakia	297	398	159	213	182	.....
Denmark	43	33	23	61	28	35
Finland	48	78	63	71	58	50
France	2,526	1,902	2,204	3,210	4,550	.....
Germany	2,984	3,521	2,719	2,944	2,968	3,387
Italy	437	763	1,115	1,095	984	.....
Japan	1,258	1,707	2,353	2,306	2,119	.....
Netherlands	98	95	280	209	133	395
Norway	67	56	60	82	33	.....
Russia	159	1,468	926	744	710	660
Spain	296	497	304	220	251	.....
Sweden	149	184	193	271	227	.....
United Kingdom	3,143	3,179	*2,280	*5,325	*3,031	*1,374
United States	30,926	36,970	35,686	28,659	25,143	28,170
U. S. (Guayule)	489	575	512	452	424	192
Total	46,688	56,149	52,222	49,443	44,564	.....

*Excess of Reexports over Imports.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Brownian Movement in Latex

Its Lately Observed Presence in Guayule Revives Interest in a Peculiar Phenomenon

THE interest of physicists in the curious and still imperfectly understood animation of components of some natural fluids and known as Brownian movement has been stirred anew by the recent announcement that biochemical study has revealed that rubber in guayule is in colloidal suspension as it is in the latex of Hevea and other rubber trees, and that in the shrub juice there is a marked Brownian movement like that in the latex of the trees which yield most of the world's rubber.

The movement gets its name from Robert Brown, an English botanist, who first noticed it in 1827 while studying the peculiar behavior in water of lycopodium spores. It was remarked later that the movement occurred in colloidal rather than in true solutions; and that size and movement showed that while particles in a crystalline solution must be primary molecules, those in a colloidal suspension must be aggregates much larger than primary molecules. At any rate the strange, incessant bumping about of the rubber or other particles is regarded as proving not only the reality of molecules, but also the molecular motion of fluids, the particles being indicators.

Theories of Noted Savants

Einstein has developed from a study of Brownian movement a mathematical kinetic theory of the properties of matter, which, though it may not be as famous as his relativity theory, is important and has been confirmed by Millikan of cosmic ray and electron weight fame. The fact that the seemingly endless collisions among the rubber particles proceed without external cause has even led some to believe that the phenomenon proves perpetual motion to be a fact and that it contradicts the principle of the conservation of energy. But a time comes when Brownian movement is retarded or ended, usually through conditions favoring increasing viscosity of the agglomeration of the suspended particles, as of rubber globules. An electrical theory attributes the movement to the rubber-colloidal particles negatively charged being bombarded by small, positively charged molecules; and small means incredibly small in atomic and subatomic physics. One rubber research worker has aptly likened the tiny rubber particle to the earth, compared with which the ultimate rubber molecule, or hydrocarbon, would be but an orange.

Prior to the discovery of rubber in suspension in guayule, five types of such particles in the latices of as many different trees and plants had been classified. A typical one is the Hevea globule varying in shape from an egg to an elongated pear and having diameters ranging from about 1.5/25,000 to 3/25,000 of an inch. Microdissection reveals a kernel of low-viscosity rubber inclosed in a thin double sac, the inner coating of which is of high viscosity rubber and the outer of non-rubber constituents. The guayule caoutchouc particle shows a nearly egg-shape form under high magnification and it appears to have a structure and phase system resembling that of Hevea.

Now Shown in Moving Pictures

Observation of Brownian movement had long been confined to individual use of the microscope, but in 1923 Ehringhaus of Göttingen found a way of displaying on a screen the motility of protoplasm and the zigzagging of rubber particles in a solution. A much better technique for such motion picture projection has been disclosed this year by N. Henry Black of Harvard, and now several hundred students instead of but one at a time can visualize better than any textbook can explain the motion caused by molecules (not the motion of molecules themselves), and can speculate on why the rubber particles in latex serum should keep continually tossing about "like footballs colliding with a tireless crowd of invisible players."

Tire Production Statistics

	High Pressure Pneumatic Casings					
	Cord			Fabric		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1927	.....	21,527,278	21,733,962	.....	766,581	1,198,549
1928						
January	3,605,064	1,684,750	1,496,047	200,322	56,218	60,404
February	4,394,561	1,697,498	1,244,812	222,655	53,220	28,719
March	4,355,309	1,564,346	1,302,644	235,673	33,168	28,431
April	4,331,499	1,307,759	1,347,854	223,274	16,198	27,523
May	4,152,775	1,404,097	1,570,710	195,886	6,787	36,567
June	3,362,861	1,345,857	1,812,907	171,349	15,107	38,401
July	3,039,349*	1,506,228	2,207,086	113,678*	9,285	58,434

	High Pressure Inner Tubes			Balloon Inner Tubes		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1927	.....	27,398,535	29,528,108	.....	25,718,529	25,143,821
1928						
January	5,328,071	1,669,894	2,014,744	4,408,235	2,411,124	2,539,535
February	5,941,626	1,949,539	1,470,668	5,046,021	3,221,756	2,602,362
March	6,071,983	1,740,238	1,442,162	5,782,551	3,683,017	2,856,342
April	6,044,843	1,628,576	1,459,826	6,434,307	3,366,957	2,815,778
May	6,220,912	1,680,621	1,713,411	7,055,801	3,695,296	3,011,432
June	5,558,455	1,661,897	2,168,337	7,311,204	3,553,191	3,184,056
July	4,435,798*	1,764,761	2,970,017	6,794,803*	3,240,455	3,576,465

	Balloon Casings			Solid and Cushion Tires		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1927	.....	26,037,452	25,111,903	.....	558,030	558,007
1928						
January	3,656,537	2,377,299	2,489,391	161,329	36,279	33,797
February	4,173,493	3,021,548	2,500,013	156,790	36,328	38,715
March	4,700,534	3,516,480	2,967,476	156,424	42,950	44,665
April	4,983,023	3,309,351	2,983,454	154,477	43,255	42,145
May	5,419,093	3,658,349	3,235,236	153,205	46,606	47,604
June	5,587,566	3,658,508	3,486,748	153,925	48,614	48,42?
July	5,215,331*	3,358,203	3,658,636	150,770*	45,792	48,081

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires	
	Cotton Fabric Pounds	Crude Rubber Pounds
1927	177,979,818	463,661,466
1928		
January	16,039,819	43,709,438
February	16,923,607	46,468,050
March	18,853,824	48,897,275
April	18,310,791	43,700,630
May	19,167,606	51,061,030
June	19,646,494	53,158,592
July	20,947,405	47,128,308

*As of July 31, 1928.
Rubber Association figures representing 75 per cent of the industry.

Composite Tire for Testing

Factory test of tires have long been made by two methods, one in which service mileage is contrasted by putting competitive tires at either side of a car and the other by putting such tires on a machine revolving them at high speed against an abrasive wheel to simulate road wear. Believing that neither method allows enough for misalinement, faulty camber, defective braking, etc., engineers of the Samson Tire & Rubber Corp., Los Angeles, Calif., have contrived what they deem is a fairer test for all samples. The tread and construction material of a competitive tire are cut into a part of a new mold, with the Samson tread, etc., filling the remainder of the mold. Thus when a casing is complete, part of the tread can be that of Samson and part that of the other tire to be tested. The material of each is subjected to exactly the same conditions of abrasion, etc., and with perfect uniformity. Samson engineers have put as many as three and four other tread constructions on the same single tire with Samson tread construction, and with satisfactory results.